A Close Call Pakistan and India avert all-out war

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SEAD/DEAD –
the deadly mission

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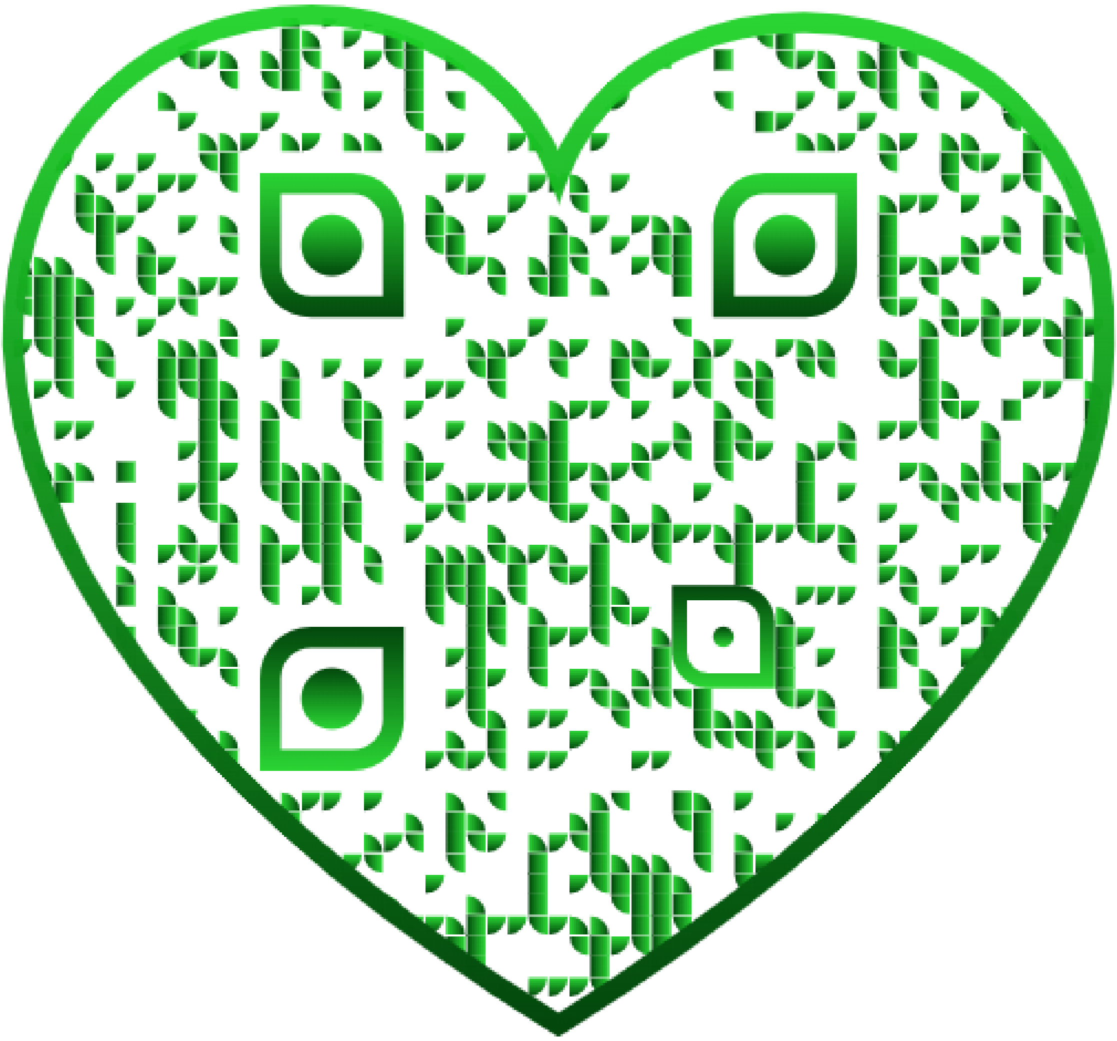

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Underdogs fight back

What a month May was. First, we had the Pakistan Air Force's alleged shooting down of five fighter aircraft, later increased to six. While India will not confirm this, India's Chief of Defence Staff, General Anil Chauhan, has admitted to Bloomberg that he had lost an 'unspecified number of fighters'. I found it quite incredible that the Indian Air Force could lose up to three cutting edge Rafales in a shoot-out with PAF's J-10CEs and JF-17Cs, armed with the impressive very long-range PL-15 air to air missile. What happened to the Rafale's SPECTRA (Self-Protection Equipment to Counter Threats for Rafale Aircraft) system? Did the PAF do such a good job jamming the jets that they didn't know what was going on, which left them sitting ducks for the incoming Chinese missiles? You may recall the 2019 Balakot clash between the two sides when the PAF again got the better of the IAF, shooting down a MiG-21 Bison and claiming a Su-30MKI that was never proved. Clearly the IAF must up its gain, and instead of relying on expensive purchases, get working on tactical doctrine. As Chauhan said: "What is important is that we learn from why they went down."

Meanwhile, the Ukraine War continues to see the escalating sophistication of operating drones. The most audacious mission came on May 31 under Operation Spider's Web, when five Russian Aerospace Force Long Range Aviation bases came under attack, that Ukraine claims destroyed "around 40 aircraft". The drones flown by operators inside converted lorries parked close to the bases, had probably been in position for days or even weeks. Over 100 FPV (First Person View) drones packed with explosives were reportedly used to attack Tupolev Tu-22M3 *Backfires*, Tu-95 *Bears* and A-50U *Mainstay* Airborne Warning and Control (AWACS) aircraft. All operate at the forefront of Russia's war with Ukraine but losing two of the A-50Us will be particularly tough for the RuAF, which lost two earlier in the war, leaving only three or four of the fleet left. This will have devastating consequences for Putin's war, restricting the RuAF's ability to monitor Russia's air space and the war from the air considerably curtailed.

FAILSAFE
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A video clip of a Ukrainian drone attacking a Russian Long Range Aviation base on May 31 *Ukraine MOD*

What caught my imagination were the converted lorries, with drones exiting their roofs supported by electronic warfare systems to stop their early detection. Such platforms could become part of any military's special operations doctrine.

For both Pakistan and Ukraine, the underdogs in their respective disputes, these victories fuel the propaganda machines that are so important in boosting morale. Of course, their opponents will always dispute the claims, often through social media, but the truth will eventually come out, won't it?

Alan Warnes
Editor at Large

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MAIN - A C-17 Globemaster from 99 Squadron over Buckingham Palace, where the British royal family had gathered on May 8 to watch the VE Day flypast MOD Crown Copyright

COVER - When it comes to SEAD/DEAD, the F-35 Lightning II will be the fighter of choice for many air forces Bartek Bera

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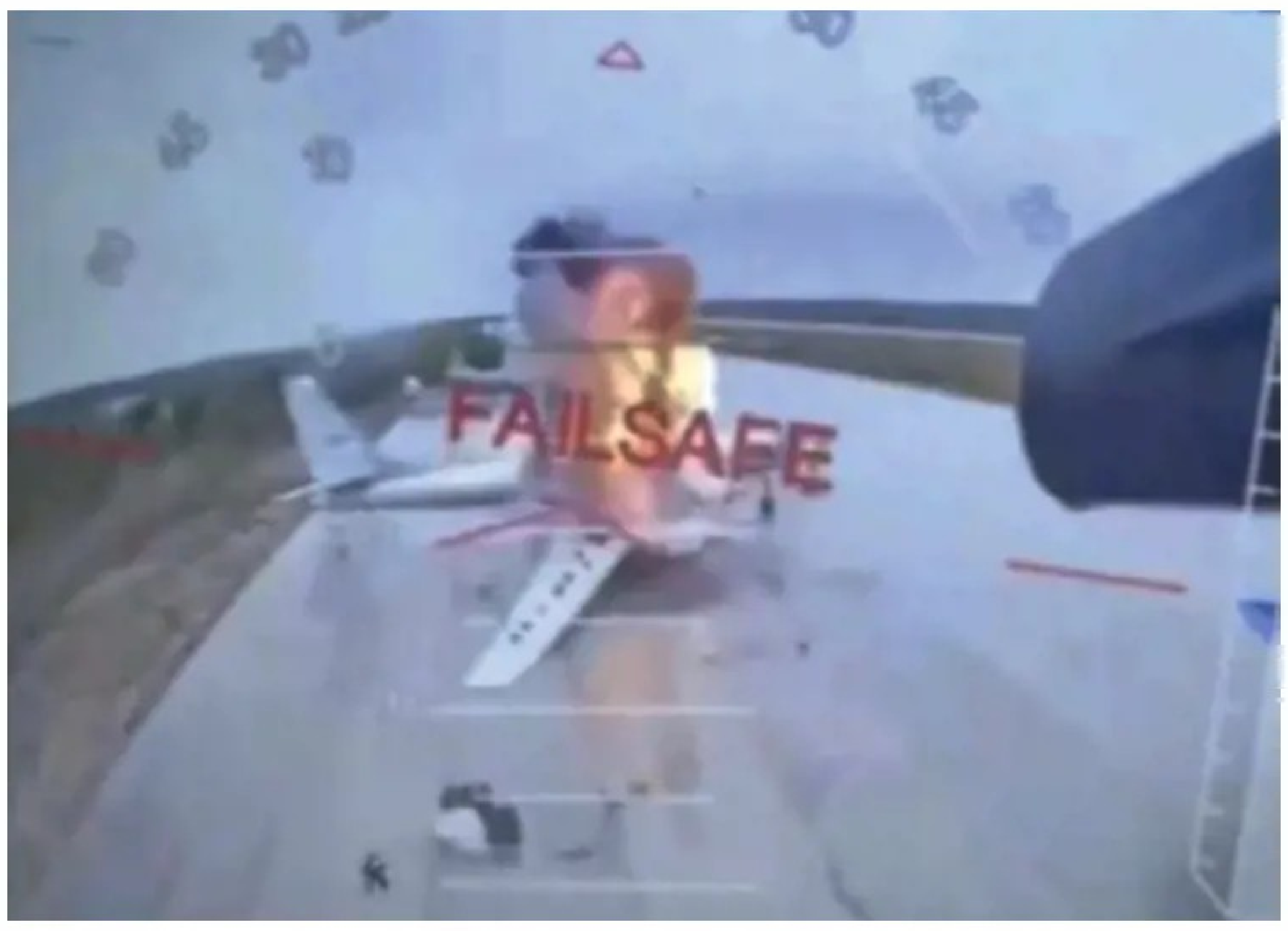

A still from one of the videos leaked on June 1 showing a destroyed Tu-95MS bomber (note that its starboard wing has just collapsed) at Olenya AB from the FPV operator's point of view *Ukrainian Internet Resources*

ON JUNE 1, Ukraine's Security Service (SBU) launched a well-planned secret drone operation aimed at destroying Russia's Long-Range Aviation (LRA). Dubbed 'Spider's web' – the aim was to cause as much destruction as possible on the strategic bomber fleet of the Russian Aerospace Forces (RuAF) tasked with delivering long-range conventional and nuclear air strikes. And it seems to have achieved its objectives at several air bases.

While the consequences of this operation were yet to be determined as *AFM* went to press, from initial reports it is clear five RuAF air bases (ABs) were targeted – Belaya AB (Irkutsk Oblast), Dyagilevo AB (Ryazan Oblast), Ivanovo AB (Ivanovo Oblast), Olenya AB (Murmansk Oblast) and Ukrainka AB (Amur Oblast).

Apart from Ivanovo AB, the home to RuAF's fleet of A-50 *Mainstay* airborne early warning and control (AEW&C) aircraft, the other four are home to LRA's fleet of some 110 Tu-22M3 *Backfire-C* and Tu-95MS *Bear-H* strategic bombers, regularly involved in deploying air-launched cruise missiles (ALCMs) against Ukraine.

This unconventional operation, 18 months in the making, involved the launch of swarms of so-called first person-view (FPV) drones, operated by a human operator, hidden inside trucks parked near their intended target. This not only assured total surprise but also prevented ground-based air defence (GBAD) assets to intervene due to their number and small size.

According to the SBU, 34% of the LRA fleet (which is no more than 130 aircraft, including the Tu-160 *Blackjack*) was destroyed or damaged in the process – the loss being estimated at US$7bn. Unofficial sources suggest that over 40 various aircraft were struck. A few videos have been leaked – confirming that two Tu-22M3s and one Tu-95MS were hit at Belaya AB, plus three Tu-95MS bombers and an An-12 *Cub* transport at Olenya AB.

The Russian MoD confirmed that all five air bases were attacked by FPV drones, acknowledging only that 'several aircraft were set on fire' at Belaya and Olenya. Regardless of the operation's final tally, which has yet to be verified, this day will surely go down in the books as a 'black day' for the RuAF's LRA. *For more on the Ukraine War see p14-15.*

Vladimir Trendafilovski

SBU's chief Lt Gen Vasyl Malyuk looks at plans of the five RuAF ABs that were targeted as part of operation 'Spider's web' – Olenya AB, Dyagilevo AB, Ivanovo AB, Belaya AB, Ukrainka AB (from top to bottom, left to right) and close-ups of the Tu-95MS (bottom left) and Tu-22M3 bombers *SBU*

UK SDR - make the RAF more agile and resiliant

MORE F-35S, upgraded Typhoons and the sixth-generation Future Combat Air System (FCAS) are vital to making the RAF more agile and resilient to future threats, the new UK Defence Spending Review has said.

The long-awaited review, published on June 2, also recommends an expansion of the E-7 Wedgetail fleet, increasing the number of A400M transport aircraft and adapting the Protector RG Mk 1 unmanned aerial system for use in long-range maritime patrol.

The Review said: "The RAF must stay at the leading edge of combat air's evolution, through the transition from exclusively crewed combat air platforms to a Future Combat Air System (FCAS) with a mix of crewed, uncrewed, and increasingly autonomous platforms, integrated into the UK's digital targeting web:

"To assure the future of UK combat air, investment in autonomous collaborative platforms (ACPs) should be considered alongside investment in FCAS and the Global Combat Air Programme. The ACPs must be designed to operate in collaboration with the fourth-, fifth- and future generations of combat aircraft and to operate from the UK aircraft carriers."

The report said more F-35 Lightning IIs will be required over the next decade. This could comprise a mix of F-35A and B models according to military requirements to provide greater value for money.

The findings in the report adds: "The RAF must further enhance its agility and adaptability to build greater warfighting readiness by:

Maintaining E-7 Wedgetail airborne early warning and control aircraft. Further E-7 should be procured when funding allows (taking account of infrastructure and operating costs). This may be expedited by a cost-sharing arrangement with NATO Allies.

Exploring providing Protector with a maritime surveillance capability, integrated with P-8 Poseidon maritime control and reconnaissance aircraft and Type 26 frigates.

Initiating investment in improving the foundations of the UK's Integrated Air and Missile Defence capabilities to bolster home defence."

The spending review says the A400Mfleet should be expanded with either more A400M, civilian charter, and/or sponsored service options, reducing routine demand on RAF air transport that does not require military capability.

It also said that Hawk T1. and Hawk T2 should be replaced with a cost-effective fast jet trainer. The current flying training arrangements for fast jets must be urgently revised to optimise capacity, building in maximum use of contractors and provision for training overseas students.

Pakistan Air Force claim Indian Rafale shootdowns

A Pakistan Air Force J-10CE of the 'Venomous Cobra' blasts off the PAF Base Minhas runway with a deadly weapons load – four very long-range PL-15s on twin racks and two PL-10s on the wing-tip pylons. The PAF claims, quite incredibly, that the J-10CEs and the similarly armed JF-17Cs of the 'Tail Choppers' shot down five Indian Air Force fighters in the early hours of May 7. *Awais Lali*

PAKISTAN AND neighbours India, both nuclear powers, came close to all-out war between May 6-9. While war was averted, the Pakistan Air Force (PAF) still claimed the shoot down of five Indian fighters – three Dassault Rafales, one MiG-29 and one Su-30MKI. All downed on the night of May 6/7. However subsequently a Mirage 2000 wreckage now appears to have been discovered too.

The confrontation came two weeks after terrorists had killed 26 civilians - 25 of them Indian and one Nepalese at Pahalgam in Indian administered Jammu and Kashmir.

The Indian government vowed vengeance against those involved. It came on May 7.

Palistan's claim on May 7, that it had shot down three Dassault Rafales was treated with scepticism, considering the French fighter's Thales SPECTRA electronic warfare system is supposed to be among the best in the world.

However, imagery soon appeared to back up the claims, showing a downed Rafale with the serial number BS001, in a field close to the Bhatinda-Basiana air force station. While much of the imagery appearing on social media etc is often 'photo-shopped' this image looks to be authentic. It soon became obvious the fighters were shot down by the newly supplied PL-15 air-to-air-missile, fired by the PAF's Chengdu J-10CE and JF-17C Thunder while still in their own air space.

During a press conference on May 9, the Pakistan military talked about an air battle involving 114 fighters - 72 Indian and 42 from the PAF. This would have been the largest air battle since World War Two. Neither side had attempted to go into each other's air space, the Indian Air Force relying on SCALP EG stand-off weapons with a range of around 350 miles (550 kms) while the J-10CE and JF-17Cs' Chinese active radar guided very long range air to air PL-15 missile has a range of up to 180 miles.

Not surprisingly, Pakistan's two Chinese military satellites were focussing on India and detected the incoming threat and downlinking the information to the PAF's Air Headquarters, which would then share the information via the Pakistan Air Force's indigenous Link 17 to the three different Air Commands. These would then send data to air defence sites where the ground based air defences were located and to air defence aircraft. The J-10CEs and JF-17C Thunders fired the PL-15s but it was the personnel onboard the Saab Erieye AEW&C and Da20 jammer aircraft that laid the foundations of the work needed to set the fighters.

The PAF claimed they shot down the fighters through their indigenous multi-domain warfare system that allows most PAF fighters to communicate with the Swedish Erieye AWACS, Dassault 20 jamming aircraft and Chinese satellites that together jammed/spoofed the Rafales, leaving the pilots unable to use the radar thus being shot down by the J-10CE or JF-17s.

The small-scale conflict ended on May 10, when a cease-fire was brokered by both sides and was still holding in early June.

Alan Warnes

Indian Air Force Rafales did not emerge from the clash with the PAF in a very good light. The PAF appear to have outfoxed the IAF. *Babak Taghvaee*

More Houthi strikes

ON APRIL 29, the RAF participated in a joint operation with US forces against a Houthi military target in Yemen. Typhoon FGR4s supported by Voyager air-to-air refuelling tankers flew the strike missions from RAF Akrotiri, Cyprus – the first such sorties this year. Struck by Paveway IV precision-guided munitions, the targets were reported as a cluster of buildings located some15 miles south of Sanaa in the west of the country, allegedly used by the Houthis to manufacture drones of the type used to attack ships in the Red Sea and Gulf of Aden.

The action was in line with long-standing policy of the UK government, following the Houthis initiating their campaign of attacks in November 2023, which has seen the majority of international shipping cease operations through the Red Sea. British defence secretary John Healey said: "The attack was launched in response to a persistent threat from the Houthis to freedom of navigation. A 55% drop in shipping through the Red Sea has already cost billions, fuelling regional instability and risking economic security for families in the UK."

Typhoons at RAF Akrotiri struck targets in Yemen onMay 29 *UK Crown Copyright*

First Jupiter HC2 delivered

The first of six new Jupiter HT2s, ZZ145, seen at Oxford Airport. *DE&S*

THE FIRST of six new Jupiter HC2s (Airbus Helicopters H145) was delivered to the UK Ministry of Defence on May 12, 2025.

Acquired under a £122m contract signed in 2024, the helicopters are set to serve with the RAF in Brunei and Cyprus from 2026. Following handover, the Jupiter was flown to MOD Boscombe Down to join the tri-service Rotary Wing Test and Evaluation Squadron, where it commenced acceptance trials the following day.

The first example, ZZ145, will be one of three based in Brunei to provide medical evacuation and medium lift capability for British troops exercising in jungle warfare. Formerly undertaken by Bell 212 AH1s of 667 Squadron Army Air Corps at Medicina Lines, the role has been filled since August 2022 by Puma HC2s of 230 Squadron.

The other three examples will equip 84 Squadron at RAF Akrotiri where firefighting and SAR duties have been undertaken by Puma HC2s since the retirement of the Griffin HAR2s in 2003. Chinooks are currently providing helicopter support to British Forces Cyprus until the Jupiters arrive.

Air Commodore Gareth Bryant said: "With the decision to retire the Puma HC Mk2 after more than 50 years of service, the imperative to deliver a replacement helicopter for Brunei and Cyprus increased in importance. Already set extremely challenging timescales, the DE&S Multi Helicopter Platform Delivery Team has worked collaboratively with Army Capability and Airbus Helicopters UK to rapidly deliver the first aircraft."

The new HC2s will be maintained almost exclusively by Airbus Helicopters UK in both operating locations.

StormShroud revealed

IN MAY 2025, the RAF announced the introduction of a new uncrewed aircraft (UAS) into operational service. StormShroud is billed as the first of a new family of autonomous collaborative platforms (ACP) and is the first tangible capability delivered following the launch of the RAF's ACP strategy in March 2024.

The platform for StormShroud is the Tekever AR3, which will carry Leonardo UK's BriteStorm electronic warfare payload. This low size, weight and power (SWAP) stand-in jammer has at its core an advanced miniature techniques generator which, when paired with a range of transmit/receive modules and antennas, can jam early warning, surveillance and target tracking radars. BriteStorm can also generate obscuration and confusion techniques to deny the enemy from building up a complete air picture. (For more, see pages 46-48)

Expansion of rear crew training

The four Avenger T1s operated by 750 NAS at RNAS Culdrose are to be upgraded *UK Crown Copyright*

A £300 million contract has been awarded by the UK Ministry of Defence to Ascent Flight Training to generate a four-fold increase in the number of Mission Aircrew students trained each year.

The move reflects the increased demand for mission aircrew for the new Wedgetail AEW1 and Protector RG1 fleets, along with continued growth of the Poseidon MRA1 force. New buildings will be erected at RNAS Culdrose and RAF Cranwell to house what is described as "new state-of-the-art realistic, synthetic and mission simulated environments, training facilities and equipment."

Ascent, in its role as prime contractor for the UK Military Flying Training System, has delivered Rear Crew Stage 1 training at RNAS Culdrose since April 2011, including a Basic Flying Training course for Royal Navy Observers and RAF Weapon Systems Officers, initially training up to 36 trainees each year.

Some 85% of the Future ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) and Rear Crew Training System (FIRCTS) will be delivered in the classroom or synthetically, using a state-of-the-art mission simulator. There will be no expansion of the fleet of four Avenger T1s (King Air 350ERs) operated by 750 NAS at Culdrose. Instead, modifications to the aircraft will accommodate increased training capacity and the onboard mission computer will use the same software as the ground-based mission simulator, enabling a seamless transition for trainees. The first trainees, including those destined for Merlin HC2 and Wildcat HMA2 helicopters, will be able to use the new training system in 2027.

Air Commodore Rob Caine, the RAF's head of flying training, said: "The introduction of the Future ISTAR and Rear Crew Training System will ensure that we can safely deliver world-class personnel to the front-line to operate in vital roles on our latest aircraft platforms including Poseidon, Rivet Joint and Wedgetail."

Wedgetail delays

PROGRESS ON the entry into RAF service of the Wedgetail AEW1 remains troubled, with the Ministry of Defence disclosing to *AirForces Monthly* that the full business case for the programme has still not been finalised. With no date set for its approval, the criteria for full operating capability remain up in the air. Delivery of the first Wedgetail AEW1 has been delayed to the end of 2025, with initial operational capability of the new airborne early warning and control (AEW&C) aircraft now anticipated in 2026.

The programme has been seeking a revision to its scheduled end date as challenges within the global supply chain, retention of an appropriately skilled workforce at the modification facility and an increase in certification complexity in the aviation sector have caused delays to the expected in-service date.

Andy Start, acting UK national armaments director and CEO of Defence Equipment and Support, told a UK Parliament Public Accounts Committee hearing on April 28, 2025: "The E-7 capability is late, and they have had real technical and delivery issues within Boeing in delivering that aircraft."

The first RAF E-7A Wedgetail delivery had been expected at the end of 2024, after the initial example, WT001 (c/n 38633), was rolled out on October 17, 2024, from the Satys Aircraft Livery paint shop at London/Southend Airport, Essex, wearing RAF markings. The RAF will receive three Wedgetails, all converted from Boeing 737-700 BBJ1s with extensive modifications undertaken by STS Aviation Services at Birmingham Airport.

Start noted: "We were originally buying five [E-7As] but reduced it to three in an earlier Strategic Defence Review. Because it's a fixed-price programme, the expectation is that Boeing will still deliver to the original price. Wedgetail's actually going to cost less than the original programme expectation."

Latest Lightning deliveries

THE RAF'S fleet of F-35B Lightnings grew to 38 on May 8 with the delivery of a further two examples to RAF Marham.

Supported by a Voyager tanker, the two new TR3 aircraft – ZM171/'037' and ZM172/'038' – were flown via Lajes with a pair of F-35Bs – ZM144/'010' and ZM145/'011' - returning from being upgraded to TR3 at MCAS Cherry Point, South Carolina. The UK has 48 Lightnings on order, the first of which was delivered in 2013. The Lightning Force is expected to declare full operating capability by the end of the year.

Lightning ZM171/'037' arrives at RAF Marham on May 8. *UK Crown Copyright*

Weapons update

The first firing of SPEAR 3 from a Typhoon was conducted in Sweden in October 2024 MBDA

REPLIES TO questions in the UK Parliament have provided an update on the continued development of new weapons for the RAF. The Brimstone 3 precision strike missile remains in the demonstration and manufacturing phase, with the first safe separation firing from a Typhoon expected this summer. The munition will be fielded in early 2026 and early 2027 on Protector RG1 and Typhoon FGR4 respectively.

Having test-fired an MBDA SPEAR 3 cruise missile from a BAE Systems-operated Typhoon for the first time in October 2024, further trials are expected on the Vidsel range in Sweden this summer. Hardware has been delivered by manufacturer MBDA to Lockheed Martin in the US to support F-35B Lightning integration activity, including on aircraft flights also planned for summer 2025. However, the SPEAR 3 weapon programme is undergoing re-baselining and the estimated current timeline for in-service capability is expected to be early 2030s.

Integration of the Meteor beyond-visual-range air-to-air missile onto the F-35 Lightning is progressing to plan. Initial Meteor midlife activities are also on track and due to report at the end of 2025. Progression to the next stage is subject to the six Meteor partner nations agreement expected later this year.

In-flight refuelling trials

RAAF E-7A Wedgetail A30-001 prepares to receive fuel from KC-46A Pegasus 18-46041 over California. USAF

A REPORT by the USAF at Edwards AFB, California, revealed that RAF personnel had participated in the rapid certification of the KC-46A Pegasus to refuel the E-7A Wedgetail. Aircrew from the UK joined colleagues from the RAAF and USAF for the trilateral test undertaken by the 418th Flight Test Squadron at Edwards.

The RAF does not possess a boom-equipped tanker, relying instead on USAF KC-135 Stratotankers to refuel its RC-135 Rivet Joints on NATO operations. When approached by *AirForces Monthly* for comment an MoD spokesperson explained: “The RAF Wedgetail AEW1 has a Boom AAR capability and will be utilising allied boom equipped aircraft to increase endurance.”

The test team in California included members of 56 Test and Evaluation Squadron from RAF Waddington.

Squadron Leader Angus Lilly commented: “This test event reflects the joint collaboration and interoperability between our three nations. We will soon begin flight testing our own E-7A aircraft and this early collaboration will help us field our capability more efficiently.”

Members of the tri-service test team pose in front of a E-7A Wedgetail at Edwards Air Force Base. (From l to r) Maj Jeremy Rohn, 418th Flight Test Squadron, Sqn Ldr Owen Hamilton, RAAF Aircraft Research and Development Unit and Squadron Leader Angus Lilly, RAF 56 TES. *USAF*

NH90 - Driving European Defence Forward

Designed and manufactured by NHIndustries, the NH90 helicopter is a symbol of European cooperation and has contributed to building a resilient and independent defense industry across Europe. Already in service for more than 20 years with nine NATO European countries, its combat-proven capabilities and advanced technology make it the most capable military helicopter in its class for naval and land missions.

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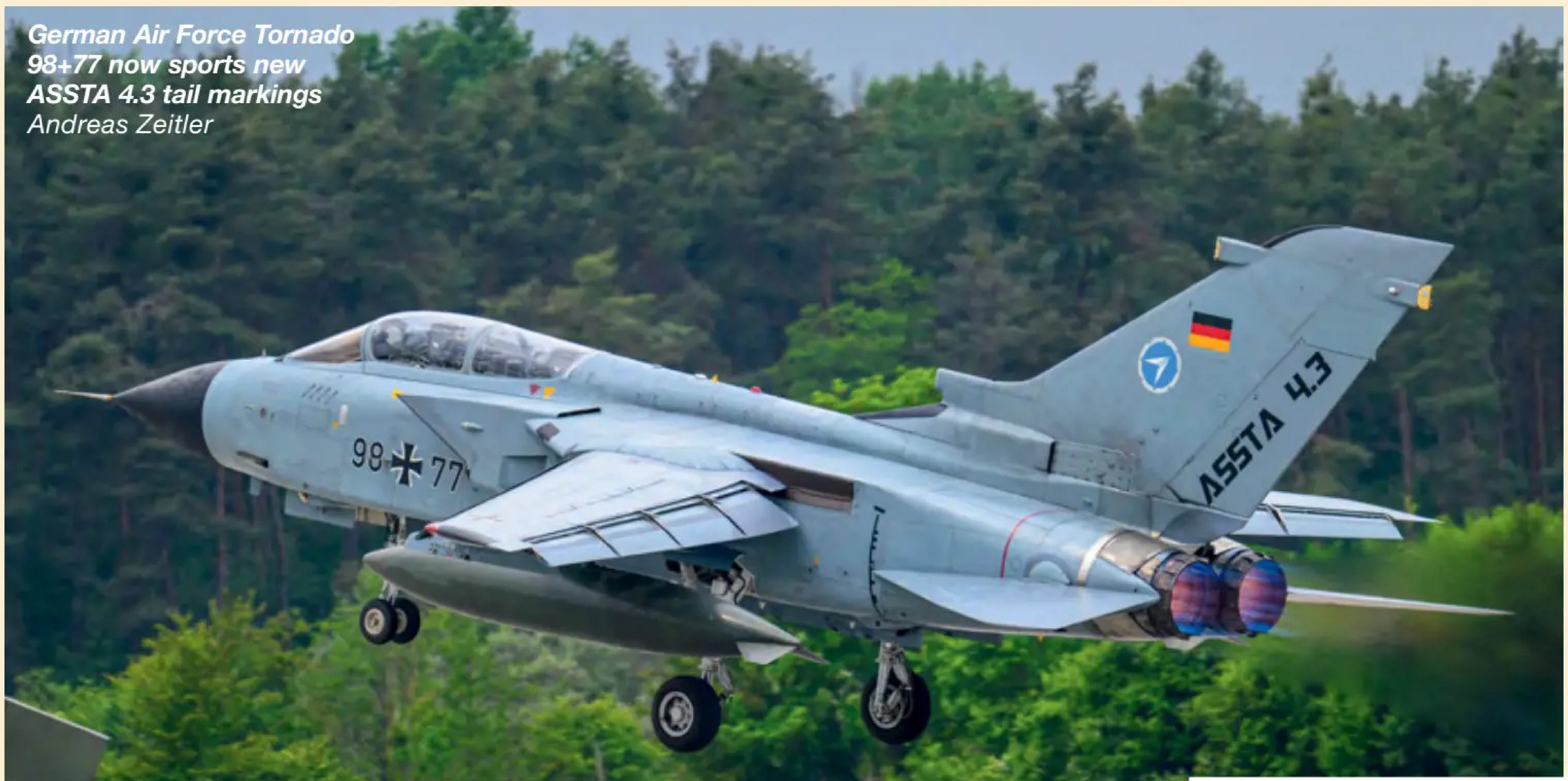
AIRBUS GKN AEROSPACE LEONARDO

Last Dutch F-16s for Ukraine

THE LAST two al Netherlands Air Force F-16s at Volkel in the Netherlands were transferred to Sabena at Charleroi Airport, Belgium, on May 26. They joined three others already present at the site. The five Vipers were transferred to the Ukrainian Air Force the following day but remain at Charleroi in stock. The UkrAF will fly them to Ukraine when needed, for example if aircraft must be switched for maintenance. The flight marked the final Viper flight by RNIAF pilots. **Gert Kromhout**

ASSTA Tornados at Manching



German Air Force Tornado 98+77 now sports new ASSTA 4.3 tail markings
Andreas Zeitler

TORNADO 98+77 was seen at Manching, Germany, in early May with new 'ASSTA 4.3' tail markings. ASSTA (Avionic System Software for Tornado in Ada) describes the version of the Luftwaffe's Tornado avionics system, which is regularly updated. Whereas information about different ASSTA 3 programs were widely available, the same cannot be said of ASSTA 4.3. However, it does show the modernisation of Germany's Tornado fleet is ongoing, despite a planned out-of-service date around 2030. Meanwhile, sistership 98+79 also took to the air recently. This test aircraft is Germany's last remaining Tornado in green camouflage. It also lost the 'ASSTA3.1' lettering on the tail, which can be interpreted as a sign that it will soon join 98+79 to flight test the ASSTA4.3 capabilities upgrade. **Andreas Zeitler**

The other ASSTA test aircraft, 98+79, has lost its 3.1 markings and will presumably join the 4.3 program too
Andreas Zeitler

Czech Gripens take on Iceland Air Policing

Five Czech Air force Gripens were flown to Keflavik on May 22 to fulfil a month-long Iceland Air Patrol tasking. Here, two are being refuelled by an MMU A330MRTT en route *CzAF*

FIVE CZECH Air Force JAS 39C Gripens from 211 Tactical Squadron based at Caslav Air Base departed for Keflavik on May 22, to take on NATO's Iceland Air Patrol tasking from May 31. The jets, serialled 9235, 9236, 9239, 9240 and 9243, were all armed with live AIM-9M Sidewinders and two, 9235 and 9236, had Litening 4i targeting pods fitted that will assist the pilots to identify in the air any aircraft.

The Gripens stay for five weeks along with nearly 100 Czech military personnel. Major General Jaroslav 'Gyro' Mika, the deputy commander of Czech Joint Ops Command, responsible for all operational assets in Czech Armed Force, told *AFM*: "As part of the responsibility, we work with the local air traffic controllers from the CRC [Control and Reporting Centre] in Iceland who don't get that much practise.

"The threat is Russian Long Range Aviation, and while [the bombers] are quite busy in another area [Ukraine] and seen regularly in the Baltics because it is their neighbourhood, it doesn't mean they don't have the capability to get to Iceland. The QRA task there in Keflavik is no different from what we perform here, but we will use an Airbus A330MRTT tanker to get to Iceland not just to train with but operationally too, and have gone through the survival training ready for the Iceland environment – windy, icy and rocky with plenty of water."

'Gyro' added: "We have just 14 jets, the availability is of course less than that. We will be covering two QRAs, one here in Czechia and the one in Iceland, and it's tough. We are on the limit of the whole system, so we have to curtail the more complex training here. That's one of the reasons why we have to expand our fleet to 24 supersonics.

"We are taking AIM-9M Sidewinders to Iceland and not the AIM-120 AMRAAMs, because of the situation on the eastern flank of NATO we keep them here."

The Czech Gripoens participated in Iceland Air Patrol in 2014, 2015 and 2016 and in 2009, 2012, 2019, 2022, and guarded the airspace of Latvia, Lithuania and Estonia during its Baltic Air Policing commitment. **Alan Warnes**

Three L-39NGs delivered to Hungary

THREE AERO L-39NG Skyfox jet trainers were delivered to the Hungarian Air Force on May 30. The aircraft, wearing Hungarian Air Force serials on the nose and Czech military aviation authority numbers under the tail, were identified as 141/'0539', 142/'0540' and 144/'0518'. They are part of an order for 12 L-39NGs – eight for jet training and four to fulfil a reconnaissance mission.

Aero announced on May 21 that the first Hungarian Air Force pilots had completed their training.

Deliveries should have begun in the second half of 2024 after the 12 Vietnamese Air Force aircraft had been delivered, but the HuAF opted to delay them so the first two of the order (7017 and 7018) were taken on by CLV (Centrum Leteckeho Vycviku – Flying Training) on January 24. CLV will replace the eight remaining L-39Cs that are now close to retirement.
Alan Warnes

All three L-39NG Skyfox aircraft are prepared for delivery to the Hungarian Air Force on May 31 *Alan Warnes*

Swedish Air Force orders VIP Global 6500s

SWEDEN'S DEFENCE Materiel Administration (FMV) announced the signing of a SEK 1.1 billion (US$115m) contract for two Bombardier Global 6500 corporate jets on May 23. They will be used by the Swedish Air Force for VIP transport and designated the Tp106, and as they are sourced from the secondhand market, they will come at a reduced cost. Delivery of both aircraft should take place by the end of 2025. They will replace two Gulfstreams being used for VIP transport, a G-IVSP (Tp102C 102004) and a G550 (Tp102D 102005).

FMV noted that the acquisition will help with logistical costs; it has also ordered three Bombardier Global 6000 GlobalEye Airborne Early Warning and Control (AEW&C) platforms designated as the S106, with the first due for delievery in 2027.

Croatian Rafales lined up

All 12 Croatian Air Force Rafales were lined up on the ramp at Zagreb-Pleso for the AIRVG airshow on May 10. The last example (159) was delivered on April 25 to the based 191 Fighter Squadron *Chris Lofting*

Written by Vladimir Trendafilovski

Russia's record drone attacks

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Using on-board machine guns, the crew of this Ukrainian Army Aviation's Mi-8MT Hip-H delivers a final blow to a Russian Shahed-136 'kamikaze' drone, visible just below the central white crosshair. *Ukrainian Internet Resources*

THE RuAF's strike aircraft set a new record in April, after they dropped 6,526 KABs - the KAB is a standard iron bomb turned into guided glide bombs by adding the UMPK wing kit. Of that number, 1,254 were on targets in the Kursk Oblast in Russia, where Ukraine forces were based after taking over the territory last year. May's numbers though were significantly reduced. A total of 5,017 KABs were released (736 of them in the Kursk Oblast), which is comparable to the quantities in February. This is presumably due to the great strain imposed on RuAF's strike aircraft fleet in April.

On the other hand, the use of drones was on the rise, and despite a unilateral ceasefire proclaimed by Russia in the May 8-10 period, when no drones were launched at Ukraine – the total for May was 4,005 drones of all types. Of these, 1,852 were shot down, and further 1,437 were decoy drones that crashed on their own. The period May 25-26 was particularly strenuous for Ukraine's air defences as in those two days combined mass missile/drone attacks were launched, the drone numbers reaching record numbers (298 and 355 respectively), beaten only by the June 1 attack at the same time of the Ukraine raid on Russia's LRA bases, when Russia's largest ever drone attack on Ukraine took place with 472 'kamikaze' and decoy drones were launched.

Ukraine was not sitting idle either – the Ukrainian Air Force (UkrAF) continues launching guided glide bombs at high-value target near the frontline, while long-range drones continue striking vital military and dual-purpose infrastructure deep inside Russia – including plants closely related to production of weapons regularly used against Ukraine (drones and missiles included).

New anti-drone warfare tactics

A Su-30SM ('36 Blue') of the 43rd OMShAP moments after landing. These aircraft frequently take part in operations against Ukrainian sea drones. An identical aircraft was downed by a Ukrainian sea drone on May 2. *Russian MoD*

NOTABLY, IN the last few months Russian 'kamikaze' drones began flying at higher altitudes to evade destruction by Ukrainian mobile drone-hunting teams. The teams, armed primarily with truck-mounted machine guns, are now unable to engage high-flying targets, requiring the GBAD to step in. However, to conserve GBAD for more important targets, all other available assets are being assigned on anti-drone duty. They include FPV interceptor drones (some boasting night-time capability), UkrAF fighters (including the F-16s and Mirage 2000s), and – last but not least – armed helicopters from all branches of the armed forces.

Slow-flying drones remain challenging targets for UkrAF fighters, often resulting in the aircraft being damaged or even destroyed after being hit by debris from the drone. At least two UkrAF fighters are known to have been lost during anti-drone sorties recently – a Su-27 on April 28 and an F-16 on May 16, which was the third UkrAF F-16 to be lost. Fortunately, in both cases their pilots survived after ejecting.

On the other hand, drones seem to be suitable targets for the various Ukrainian helicopters involved in anti-drone duties, the Mi-8/17 *Hips* and Mi-24 *Hinds* of the Ukrainian Army Aviation plus Sea Kings of the Ukrainian Navy have all been confirmed fulfilling this role. Helicopters are much more successful than fighters and, using their onboard guns or machine guns, can down ten or more drones in just a single mission. This is confirmed by the fact that a single Mi-8 pilot, Lt Col Roman Bilobryukhov, shot down 138 'kamikaze' drones by May 23 in just two rotations on anti-drone duty.

Netherlands delivers last F-16s

This UkrAF F-16AM returns from a successful anti-drone sortie on the morning of May 6 with just a single AIM-9M AAM remaining. *UkrAF Command*

IN MAY, the last four Dutch single-seat F-16AMs that were stored at Volkel AB were flown over to the Sabena Engineering maintenance, repair and overhaul (MRO) facility – located at the Brussels South Charleroi Airport in Gosselies near Charleroi, Belgium (see Continental Europe news, page 12-13). J-516 was first to depart on May 8 and was followed by J-060 on May 15, with J-011 and J-641 arriving on May 26. Here they joined the fifth aircraft, F-16AM J-146, which was already on site since last October.

On May 27, these five aircraft were officially handed over to the UkrAF, finalizing the Dutch donation of a total of 24 F-16AMs. The remaining 19 'Vipers' had already been delivered to Ukraine via Poland in four separate batches, starting from September 16, 2024.

It remains to be seen whether the last five aircraft would depart for Ukraine in the near future, after undergoing the necessary check-ups and maintenance at Sabena Engineering, or remain there as an operational reserve, ready to be picked up by UkrAF pilots that will bring in some of the previously delivered F-16s for repair and maintenance.

With this last batch of ex-Dutch aircraft the UkrAF now has a total of at least 33 F-16s – 36 confirmed delivered from Denmark and the Netherlands of which three were confirmed lost.

Ukrainian sea drones strike again

THE WORLD'S first case of a rotary-wing aircraft downed by an unmanned surface vessel (USV, known colloquially as a 'sea drone') was recorded on December 31 last year, when a Russian Navy (RuN) Mi-8 helicopter fell victim to an adapted R-73 (AA-11 *Archer*) IR-guided air-to-air missile (AAM) launched by a MAGURA V5 sea drone used by the Main Directorate of Intelligence of the Ukrainian Ministry of Defence (HUR MOU) – for more details see *A Ukrainian victory at sea, AFM* March 2025, p15.

A new 'historic first' – this time for a fixed-wing aircraft – was recorded on May 2, when at least one RuN Su-30SM *Flanker*-H multi-role fighter fell in the Black Sea after being struck by an AAM launched from a HUR MOU USV, approx. 50km west from the Russian port of Novorossiysk.

Lt Gen Kyrylo Budanov, head of HUR MOU, stated that the latest incident involved the new MAGURA V7 armed with AIM-9 Sidewinder AAMs, claiming that two Su-30SMs were downed that day. A video showing one aircraft being shot down was released, but the claim of a second Su-30SM and the type of AAM involved remain unconfirmed.

While Russia's MoD remained silent, Russian military bloggers confirmed the loss of one Su-30SM of the 43rd Separate Naval Assault Aviation Regiment (OMShAP) at Saki AB in Russian-occupied Crimea. Its pilots ejected safely, subsequently being picked up and brought to shore by M/V Victoria Fortune, a Liberian container ship bound for Novorossiysk.

Two Su-24Ms from RuAF's 37th Composite Aviation Regiment (SAP) sit ready at their home base in Gvardeyskoye, Crimea, armed with a pair of 500kg RBK-500 cluster bombs for engaging swarms of Ukrainian sea drones. *Russian Internet Resources*

The RuN aircraft and helicopters have been successfully engaging Ukrainian USVs in the Black Sea for some time now, using various weapons – including, but not limited to, conventional and cluster iron bombs and on-board machine guns. Consequently, since the spring of 2024 some of the USVs began to be armed with adapted short-range AAMs or remotely-operated machine gun turrets, intended as self-defence against Russian threats.

Hermeus flies Quarterhorse MK1 for the first time

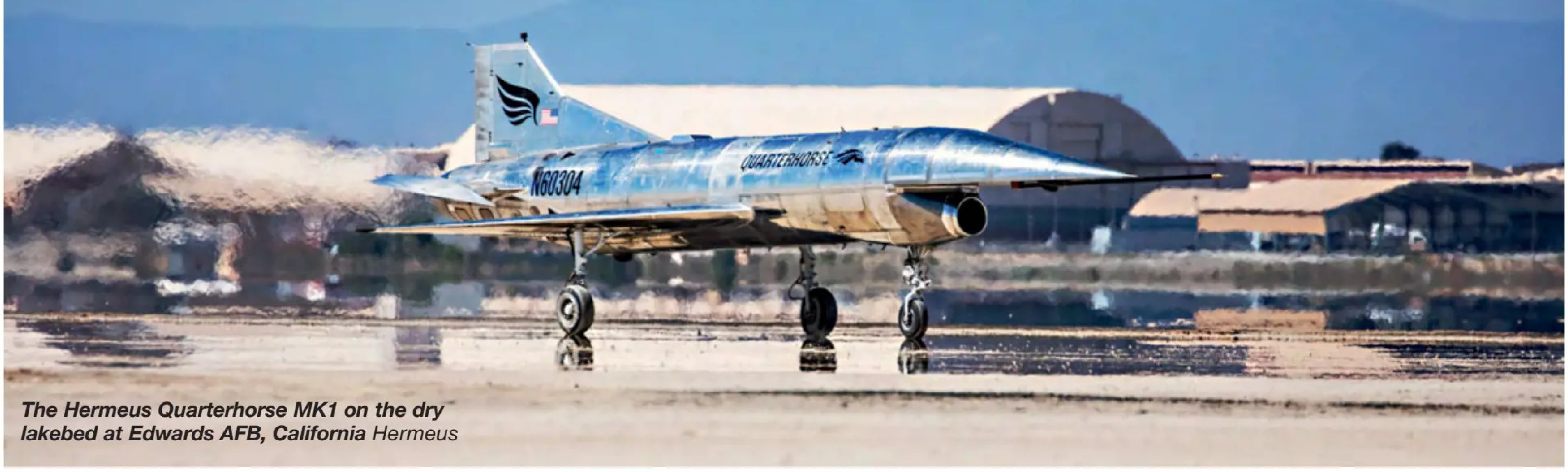
THE UNCREWED Quarterhorse Mk1 has flown for the first time at Edwards Air Force Base, California. Developed by Hermeus, which specialises in building high-speed aircraft, it is set to undergo a series of test flights at Edwards, beginning in May 2025. Hermeus hopes these flights will bring it closer to its goal of flying the autonomous vehicle at near-Mach 5 speeds by 2026.

Hermeus CEO AJ Piplica said: "We have proven the viability of our iterative development approach. But this is just the start. We have much more to do as the bar rises for the next iteration."

The Quarterhorse Mk1 is the second iteration of the aircraft, following a non-flying prototype. The company is aiming to build one airframe per year and intends to supply the Defense Department with hypersonic aircraft, claiming that it will also "enable operational defence capabilities."

Hermeus said: "The company's approach emphasises 'hardware richness' – building multiple prototypes in quick succession – allowing the team to take well-managed technical risks, while driving technical progress towards high-speed flight. This approach simultaneously enables Hermeus to rapidly develop its team and talent."

A third iteration, the Quarterhorse Mk2, is currently being built at the company's headquarters in Atlanta, Georgia, where it is incorporating data from the Mk1 test flights.



The Hermeus Quarterhorse MK1 on the dry lakebed at Edwards AFB, California *Hermeus*

USAF to begin rotations to Misawa

THE USAF plans to begin rotational fighter squadron deployments to Misawa Air Base (AB) in Japan, as the based 35th Fighter Wing begins divesting its F-16C/Ds in preparation for its transition to the F-35A. In July 2024, the air force announced the 36 Block 50 Vipers operated by the 13th and 14th fighter squadrons would be replaced by Lightning IIs. The wing is scheduled to receive the first of 48 F-35As in spring 2026, but will begin drawing down its F-16s this summer.

According to the Pacific Air Forces, the rotations will "ensure the continuation of our long-standing mission to defend Japan and maintain an open and free Indo-Pacific." The assignment of 12 additional aircraft to the wing will provide a significant increase in capability. Misawa will be the second wing within PACAF to host the Lightning IIs, following the 354th FW at Eielson AFB, Alaska.

New EA-37B begins training in Arizona

THE EA-37B Compass Call attack aircraft has flown its first training mission at Davis-Monthan AFB, Arizona.

The new aircraft, which replaces the EC-130H Compass Call, is based on the Gulfstream G550 and has been adapted to provide support to the US and allied forces against enemy attacks. It comes complete with defence systems for jamming enemy communications, radar and navigation signals, and can also wirelessly defuse roadside bombs and block enemy transmissions. This capability means it will be able to participate in suppression of enemy air defense (SEAD) missions.

The training was conducted on May 2, 2025, by the 43rd Electronic Combat Squadron (ECS). Squadron commander Lt Col Tray Wood said, "This EA-37B mission culminates years of planning and co-ordination between thousands of people spanning many organisations. The hard work and dedication of these groups ensure the [55th] Electronic Combat Group is prepared for future conflict, with the 43rd ECS leading developments in the electromagnetic spectrum."

Personnel from the 43rd Electronic Combat Squadron board an EA-37B Compass Call for its first training sortie on May 2 *USAF/Airman Samantha Melecio*

A deal is in place for the USAF to purchase 10 EA-37Bs from BAE Systems and L3Harris. Five have already been delivered, with the remaining scheduled for delivery in 2027 and 2028. Lt Col Jesse Szweda, the squadron's director of operations, said: "The EA-37B and the professionals who support its mission represent the most recent evolution in a long history of [electromagnetic spectrum] dominance for the [55th] Electronic Combat Group. The capabilities of this platform are the cornerstone to addressing emerging threats in any area of responsibility at any time."

F-47 acquisition learns from previous mistakes

GENERAL DAVID Allvin, USAF Chief of Staff, has said in a statement that the acquisition strategy has shifted for the F-47 sixth-generation fighter jet. Speaking at the Senate Armed Services Committee hearing on May 20, he confirmed that the service is taking a totally different acquisition approach to the Boeing F-47 than it did on the F-35 Joint Strike Fighter, allowing for rapid software-based upgrades without relying on the original contractor.

Back in 2023, the military entered into a deal with Lockheed Martin for the F-35. The acquisition philosophy at the time, known as Total System Performance, meant that the contractor on a programme would own it for the system's entire life cycle. Subsequently, the Pentagon regretted not obtaining the rights to the F-35's sustainment data when the deal was signed, which significantly hindered the military's ability to sustain the jet independently.

Allvin said: "The primary difference is that we now have more control over the [F-47] project as it moves forward. We have in-sourced more. We have more ownership of the tech base. We guided a government reference architecture, so we own the mission systems. So others can come in and play, but we own the development, the upgrade."

F-35Bs deploy to Iwakuni

A SQUADRON of F-35B Lightning IIs has been deployed to Marine Corps Air Station (MCAS) Iwakuni, Japan. The stealth fighters with Marine Fighter Attack Squadron (VMFA)-211, based at MCAS Yuma, Arizona, flew out on May 10, 2025, under the Marine Corps deployment programme, which aims to enhance US-based units with operational experience in the Indo-Pacific region. The squadron, also known as 'Wake Island Avengers', will integrate with Marine Aircraft Group (MAG) 12, part of the 1st Marine Aircraft Wing (MAW), to deliver essential aviation support and enhance operational readiness in the area.

For security reasons, Maj Joseph Butterfield of the 1st MAW declined to comment on exactly how many aircraft were deployed. However, he did indicate that a fighter attack squadron typically consists of ten aircraft with pilots and maintainers: "We are working toward modernisation efforts throughout Marine Corps aviation. This comes from the 2022 Aviation Plan that supports Force Design 2030 to improve capabilities and restructure Marine Corps aviation."

The F-35B's are equipped with advanced stealth features, sensor fusion and short take-off/vertical landing (STOVL) capabilities, significantly enhancing operational flexibility and survivability.

The presence of units like VMFA-211 complements Japan's growing defence capabilities, particularly in defending remote islands and securing critical sea lanes, and ensures that both the Marine Corps and allied forces are prepared for any conflict, while also preserving peace and stability within the region.

A USMC F-35B Lightning II from VMFA-211 arriving at MCAS Iwakuni, Japan, on May 10, 2025 *USMC/LCpl Erick Reyes*

Wyoming ANG selected for C-130J upgrade

THE USAF announced on April 18 the selection of the Wyoming Air National Guard's 153rd Airlift Wing to receive C-130Js to replace its ageing fleet of C-130Hs. The wing is one of four units that carry out aerial firefighting with the US Forest Service's Modular Airborne Fire Fighting Systems (MAFFS) and was activated for the wildfires that struck the Los Angeles area of California in January 2025. The wing's 187th Airlift Squadron will welcome the first of eight C-130Js to its base at Cheyenne Regional Airport from early 2028. The 153rd is the fifth unit to be selected for conversion to the C-130J following the 182nd AW in Peoria, Illinois, the 133rd AW in Minneapolis, Minnesota, the 120th AW in Great Falls, Montana, and the 103rd AW in Windsor Locks, Connecticut.

Tom Kaminski

Singapore and Indonesia join forces

THE REPUBLIC of Singapore Air Force (RSAF) and the Indonesian Air Force (TNI AU) conducted Exercise Elang Indopura at Roesmin Nurjadin Air Force Base, Pekanbaru, Indonesia, from May 13-26. More than 100 personnel from both air forces were participating in the biennial exercise, involving four RSAF F-16C/Ds, one A330 multi-role tanker transport (MRTT) and two TNI AU F-16s.

Inaugurated in 1980, the bilateral exercise commemorated 45 years of defence relations between the RSAF and TNI AU. As part of the event, F-16 fighters from both air forces conducted air-to-air refuelling with the RSAF A330, as well as joint air-to-ground training at the Siabu Air Weapons Range in Indonesia.

RSAF director Col Jonavan Ang said: "Exercise Elang Indopura continues to be an important exercise for our two air forces. The training brings our aircrew and ground crew together to develop operational competencies, as well as strengthen the camaraderie amongst our people. It is an invaluable experience for all participants, and I look forward to many such opportunities to deepen our bilateral co-operation."

The Republic of Singapore Air Force and the Indonesian Air Force's F-16 aircraft conducting air-to-air refuelling with RSAF's A330 during Exercise Elang Indopura *RSAF*

The 45 years of bilateral air exercises underscores the close and long-standing bilateral defence relations between Singapore and Indonesia. The RSAF and TNI AU also engage regularly in a broad spectrum of activities, which include cross-attendance of courses, professional exchanges and reciprocal visits.

Japanese jets scramble to Chinese carrier

JAPAN HAS scrambled fighter jets for the first time to intercept aircraft flying from China's *Liaoning* aircraft carrier. the Japanese Joint Staff said the carrier and its escort warships sailed within 200km of Japan's territory and began flight operations.

The statement said: "At around 0700HRS, Sunday, May 25, 2025,the Japan Maritime Self-Defense Force (JMSDF) spotted the following five People's Liberation Army Navy vessels sailing in the waters approximately 200 km north of Kubashima Island."

The vessels tracked were the Kuznetsov-class CV *Liaoning* (hull number 16), two Luyang-III-class guided missile destroyers (hull number 121 and 122) and two Jiangkai-II-class guided missile frigates (hull number 515 and 599). On the same day, the JMSDF observed take-offs and landings of carrier-based fighters and carrier-based helicopters from *Liaoning*.

Malaysia unveils helicopter deal

THE MALAYSIAN armed forces have signed a deal with Leonardo and Weststar Aviation Group to deliver a mix of helicopters to fill multiple roles with the country's air force and army. The 'sale and purchase' framework unveiled on May 21 will cover up to 28 rotary-wing aircraft, with some to be distributed to Kuala Lumpur's other government agencies. Deliveries will run from 2026 to 2027.

Leonardo said the programme represents a significant growth of Leonardo Helicopters' presence among several Malaysian military, homeland security and public service operators. this includes various types for the Royal Malaysian Police and Bomba for law enforcement, utility, transport, firefighting, EMS/SAR and disaster relief missions. The programme also includes AW149 helicopters for the Royal Malaysian Air Force and the Royal Malaysian Army, for combat search and rescue and utility applications

Leonardo will supply its AW149 to the Royal Malaysian Air Force and the Royal Malaysian Army *Leonardo Helicopters*

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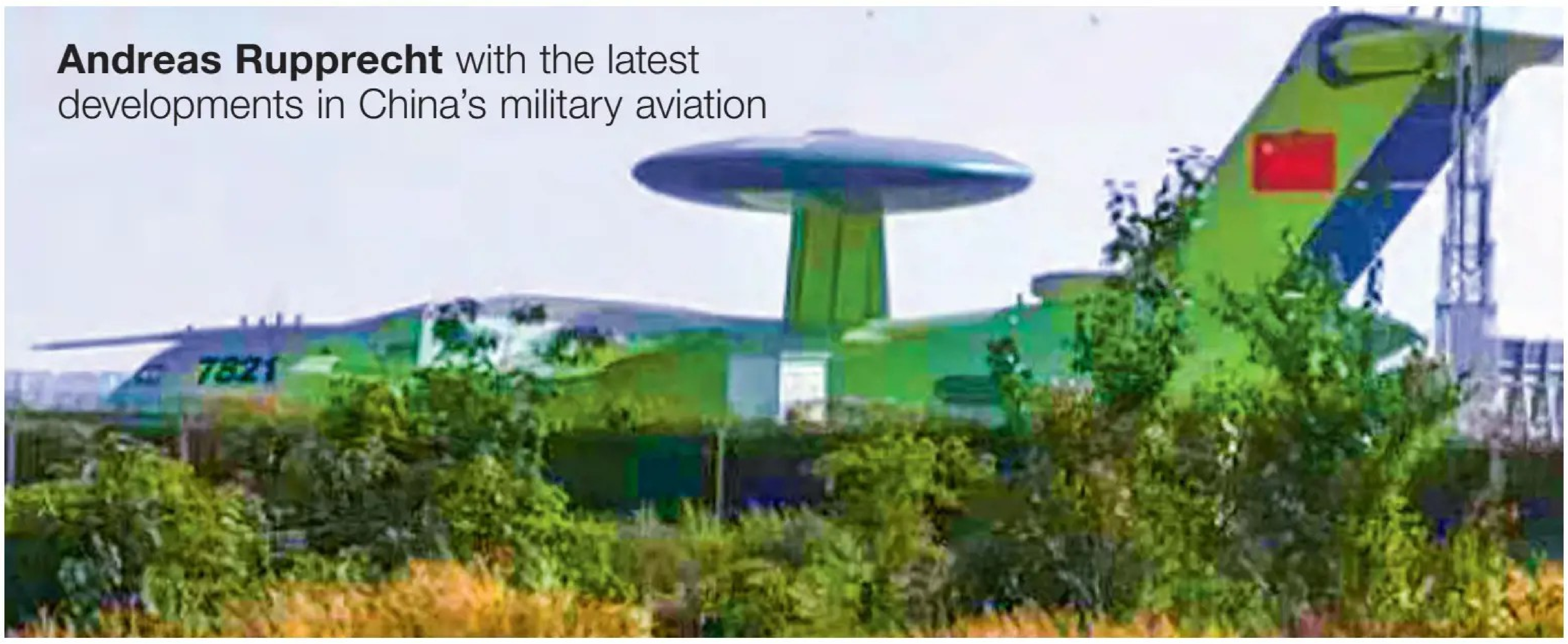
KJ-3000 - next generation AEW progress

Andreas Rupprecht with the latest developments in China's military aviation

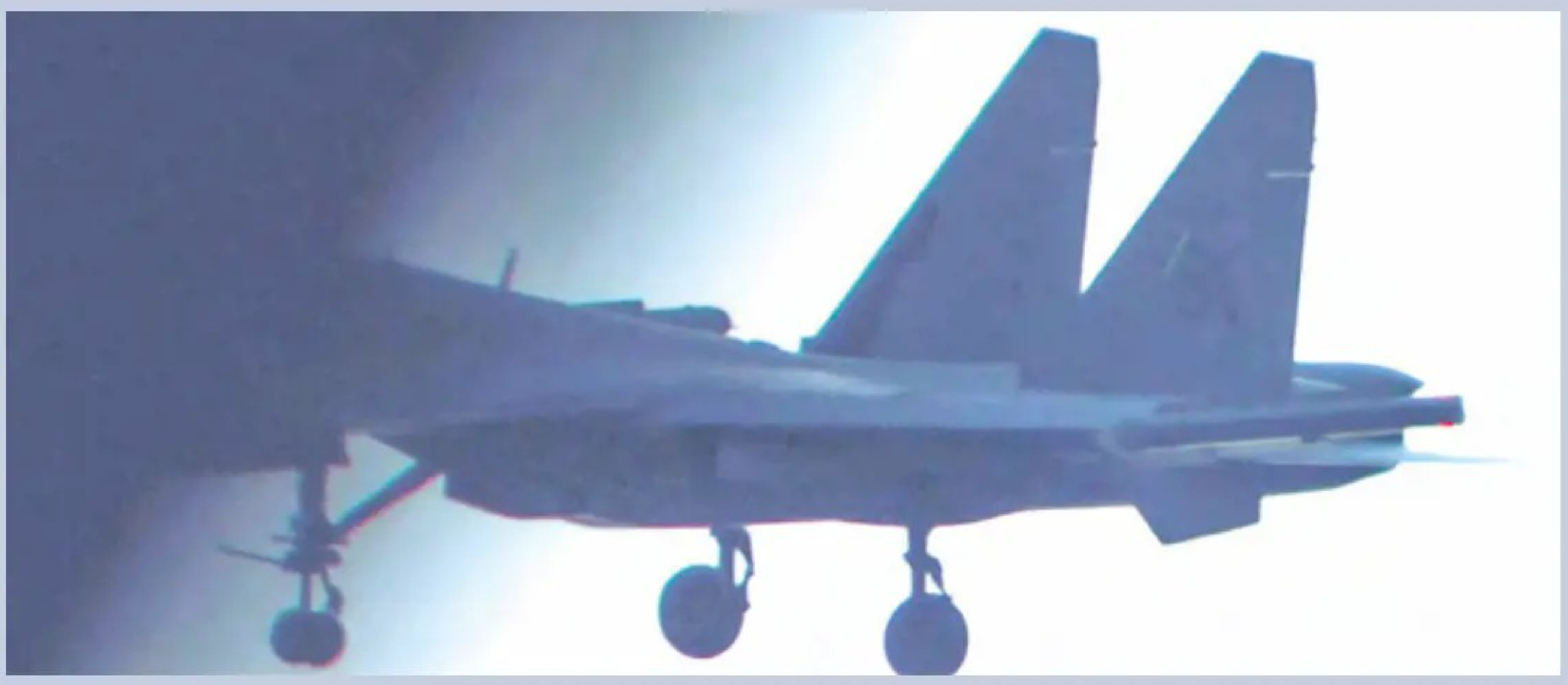
THE NEXT-generation heavy AEW type KJ-3000 of the People's Liberation Army Air Force (PLAAF) was seen again during another test-flight over the Chinese Flight Test Establishment (CFTE) at Xi'an-Yanliang. A clearer image was also posted showing the first prototype no 7821 at XAC's homebase in Xi'an.



The clearest image so far of the single KJ-3000 prototype
All images, via Chinese internet

J-15DT - catapult-capable EW-naval Flanker confirmed

IN LATE 2024, the EW-variant of the J-15D based on the regular STOBAR J-15 (sometimes called J-15DH) was revealed as being in service. However it was always expected that a dedicated CATOBAR capable variant would be developed for the PLANS-18 Fujian and future PLAN aircraft carriers. This has now been confirmed and is expected to be designated J-15DT.



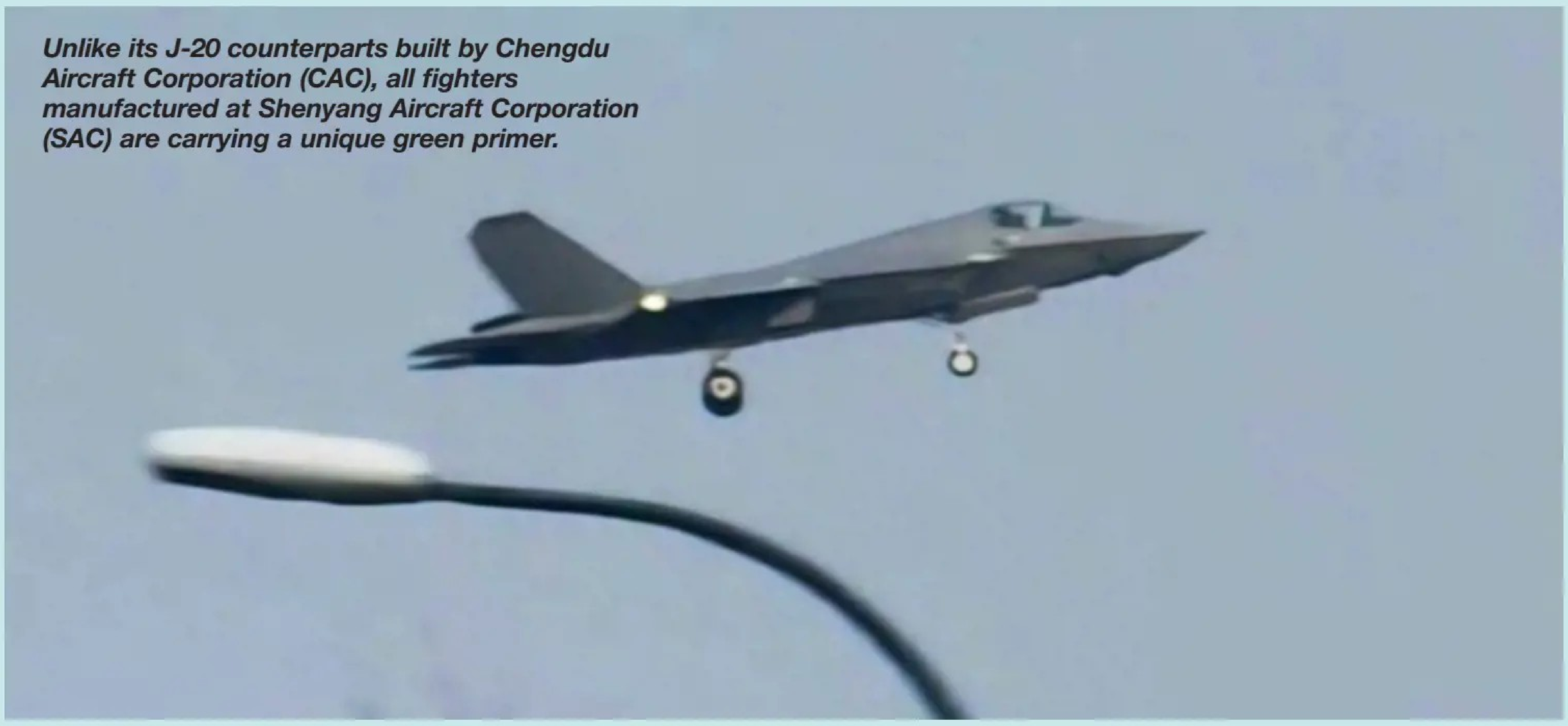
Only poor quality images of the catapult-capable EW variant J-15DT have been revealed, but clearly the landing gear is different.

Y-20B now in widespread PLAAF service

POWERED BY indigenous WS-20 engines, the Y-20B is becoming more widespread in PLAAF service. During November 2024, the first five were noted at Kaifeng, home of the 13th Transport Division, 37th Air Regiment, which also operates a full regiment of regular Y-20A transports. Since then, several more have been identified by their serial numbers, including this example, 20345. Up to 12 are believed to be in service already.

Only prototypes of the Y-20B have been seen or very blurry images of operational ones

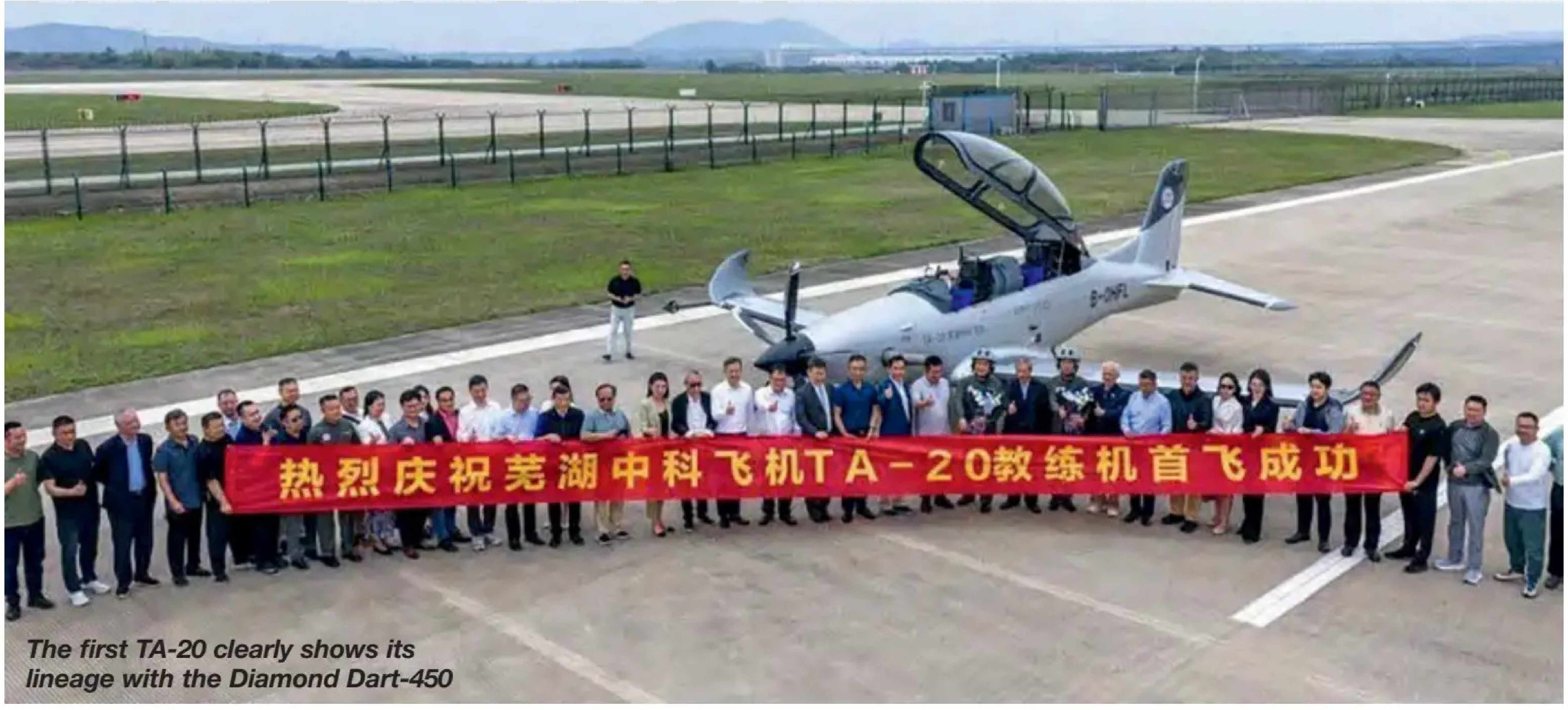
J-35A reportedly enters LRIP


Unlike its J-20 counterparts built by Chengdu Aircraft Corporation (CAC), all fighters manufactured at Shenyang Aircraft Corporation (SAC) are carrying a unique green primer.

BASED ON images and eyewitness accounts on Chinese social media, the variant J-35A has entered low rate initial production (LRIP). Allegedly, the first prototype of the expected export variant – temporarily called J-35AE – has also been flown. Chinese sources claim that a first customer has signed a contract for the type, but surprisingly – and contrary to other claims – it is not the Pakistan Air Force.

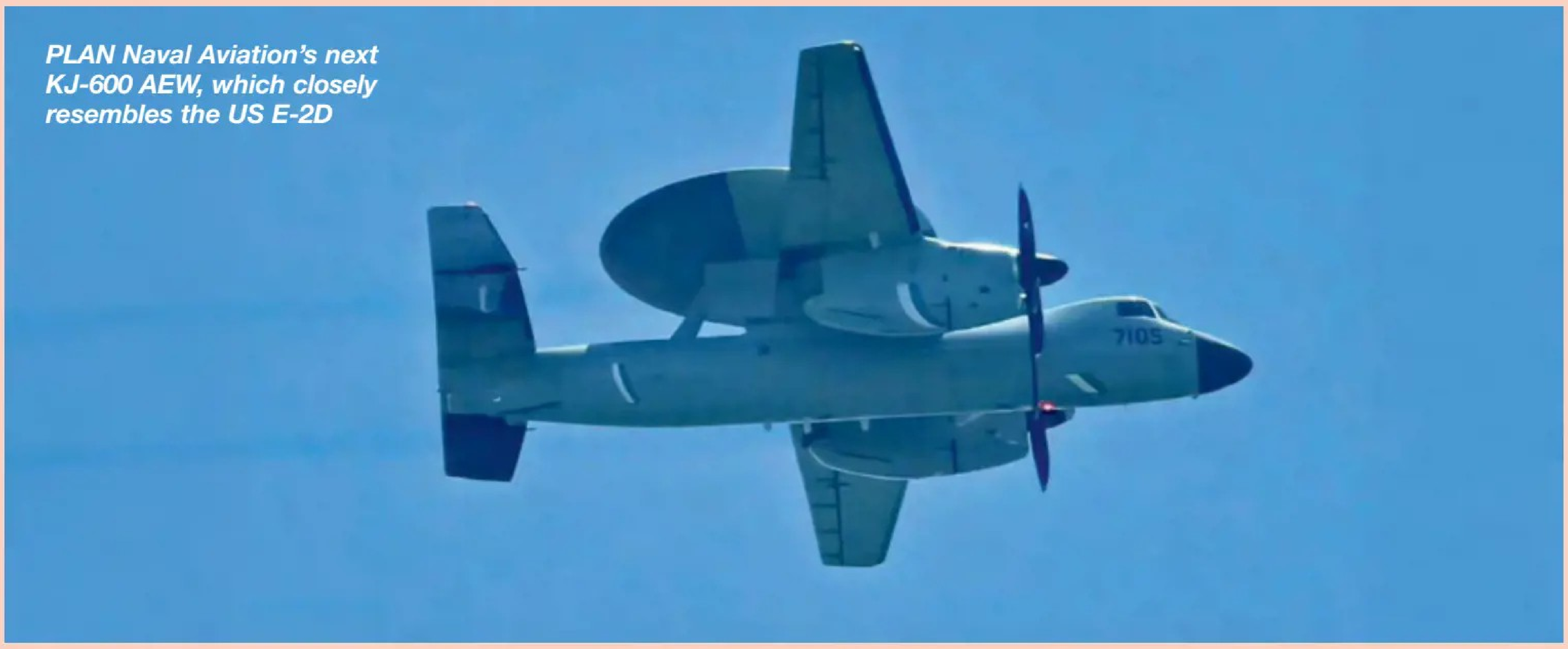
China‘s new turboprop trainer

ALLEGEDLY, THE prototype TA-20 – a completely new Chinese version of the Diamond Dart-450 – has flown for the first time, although a locally manufactured version using alternative Chinese avionics flew in November 2018 after the Wanfeng Auto Holding Group bought the Diamond company in 2016/2017. How much the new version differs from the original is not yet clear, but the TA-20 is rumoured to be a basic trainer option for the PLAAF.



The first TA-20 clearly shows its lineage with the Diamond Dart-450

KJ-600 prepares for public debut



PLAN Naval Aviation's next KJ-600 AEW, which closely resembles the US E-2D

THE XIAN Aircraft Corporation's KJ-600, the PLAN Naval Aviation's next carrier-borne airborne early warning aircraft, appears ready for its public debut. During May, two KJ-600s were seen practicing in a formation flight together with several J-15T fighters close to Lingshui, Hainan, allegedly for a PLA parad planned for September 3.

New Bells for Argentine Army

ON APRIL 7, the 8th Mountain Aviation Section in the province of Mendoza, held a reception ceremony for the new Bell 407GXi helicopters, recently incorporated by the Argentine Army. These aircraft, deployed in Mendoza after their arrival from the United States, were assigned to the 8th Mountain Aviation Section, an independent section that has the responsibility of providing helicopter flight support to the different mountain activities carried out by army troops in the Mendoza mountain range. Its incorporation represents the replacement of the legendary Aerospatiale SA-315B Lama, of which the last example is still operational and will be replaced once the third Bell 407 is received in 2026.

Santiago Rivas

One of the new Bell 407GXi helicopters at the ceremony on April 7 *Argentine Army*

Paraguay Super Tucanos near completion

Work continues on the final preparations for the first of the two Super Tucanos *Paraguayan Air Force*

THE FIRST two Super Tucanos to be delivered to the Paraguayan Air Force are now ready for delivery. On November 19, 2024, Paraguay announced the purchase of six Embraer EMB-314 Super Tucano light fighters, in a US$100m transaction financed by Brazil's National Bank for Economic and Social Development (BNDES).

The version of the Super Tucano acquired by Paraguay is an export model with the following: fully digital instrument panels with two multifunctional color liquid crystal displays of 15.24x20.32cm and a screen of 13.76x17.52cm; synthetic package that expands on-board training capabilities; chaff/flare dispensers; external armour; laser rangefinder; ability to use laser-guided bombs; MX-15 camera that provides conventional and thermal imaging; and night vision goggles. Initially, the fleet will use conventional weapons, having acquired 12 launchers for seven LAU-32 rockets of 70mm each, as well as general purpose bombs.

The contract includes logistical support with spare parts and scheduled maintenance, as well as stations for mission planning, instructions, and briefing.

The six A-29s were scheduled for delivery in May and sport a two-tone Southeast Asian-style camouflage – green and sand on top and medium gray on the underside.

The aircraft, with registrations FAP 1101 and FAP 1106, will equip the FAP Air Tactical Group of the 1st Air Brigade, in Luque, at the Ñú Guasú Air Base.

Santiago Rivas

Argentine Air Force develop NVG capability in the Pampa

The flight tests to certify night vision capabilities on the IA-63 Pampa *Argentine Air Force*

THE IA-63 Pampa successfully passed flight tests with its new night vision capability, in which the cockpit and its lighting system are adapted to be compatible with a Night Vision System (NVS), including Night Vision Goggles (NVGs). The lighting in the aircraft's cockpit was modified so that pilots can see the instruments without problems while wearing night vision goggles. The test work was carried out on the IA-63 Pampa III Block 2 registered EX-03, belonging to the Flight Test Center of the Argentine Air Force. At the request of the Argentine Air Force, FAdeA is installing and carrying out the corresponding validation tests of these systems on the IA-63 Pampa.

Santiago Rivas

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587/25

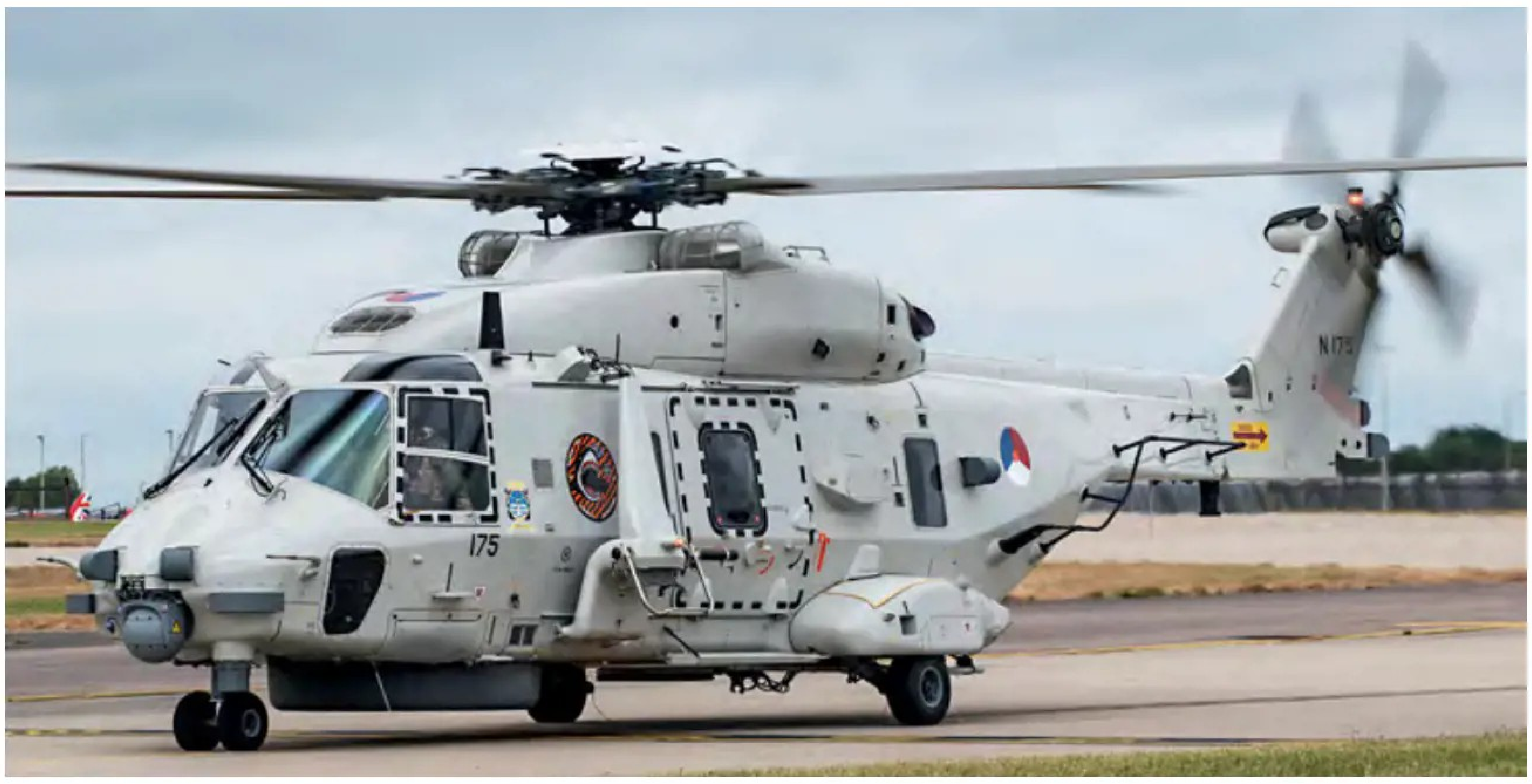
Just Passing Through

Ben Stanley Hall showcases the rich diversity of aircraft movements up and down the UK

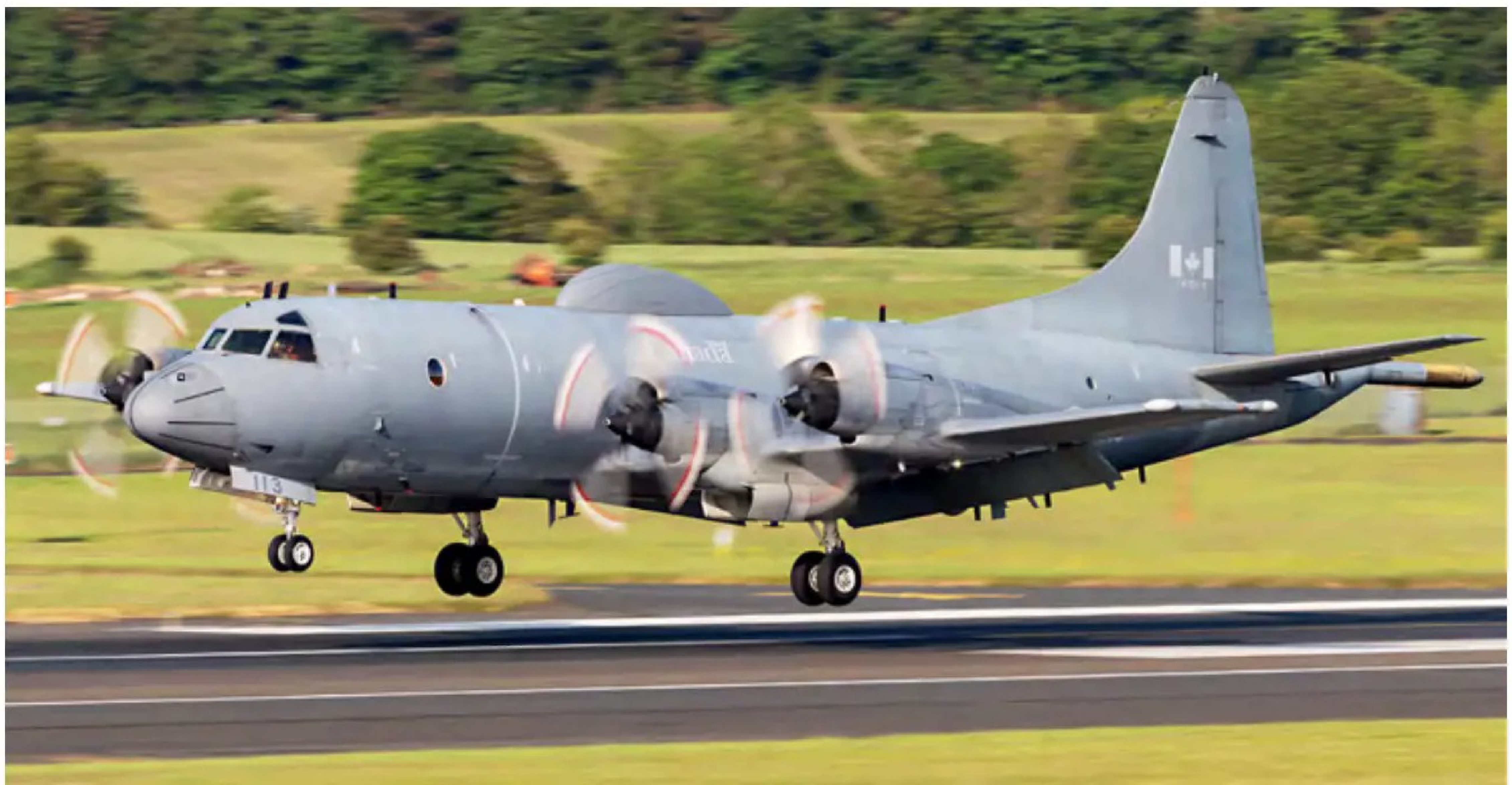
UNITED STATES OF AM

This month's movements are headed by the leader of the free world, if you believe the 47th President of the United States is that man. Hailing from where President Donald Trump was transiting from an E-3 and A330MRTT from the Royal Saudi Air Force en route to the US. Closer to home, we have a Dutch NH90 in Lincolnshire and a Belgian A400M in Scotland

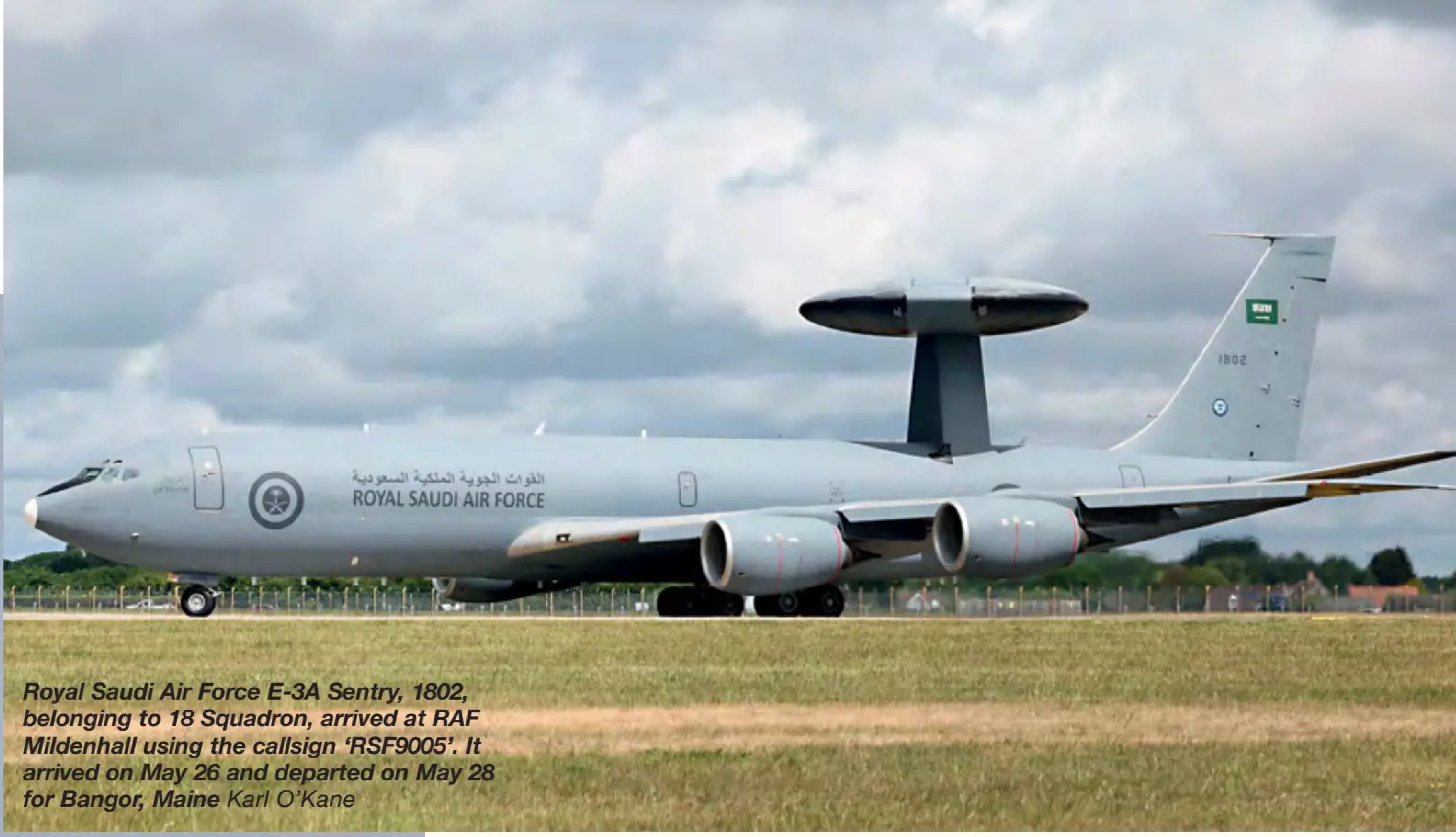
We welcome contributions from readers across the world. If you photograph an aircraft that is not in its usual location or could be of interest, please email your images, without watermarks, to ben.hall@keypublishing.com using the subject heading 'Just Passing Through', with a short caption including as much information as possible.**afm**



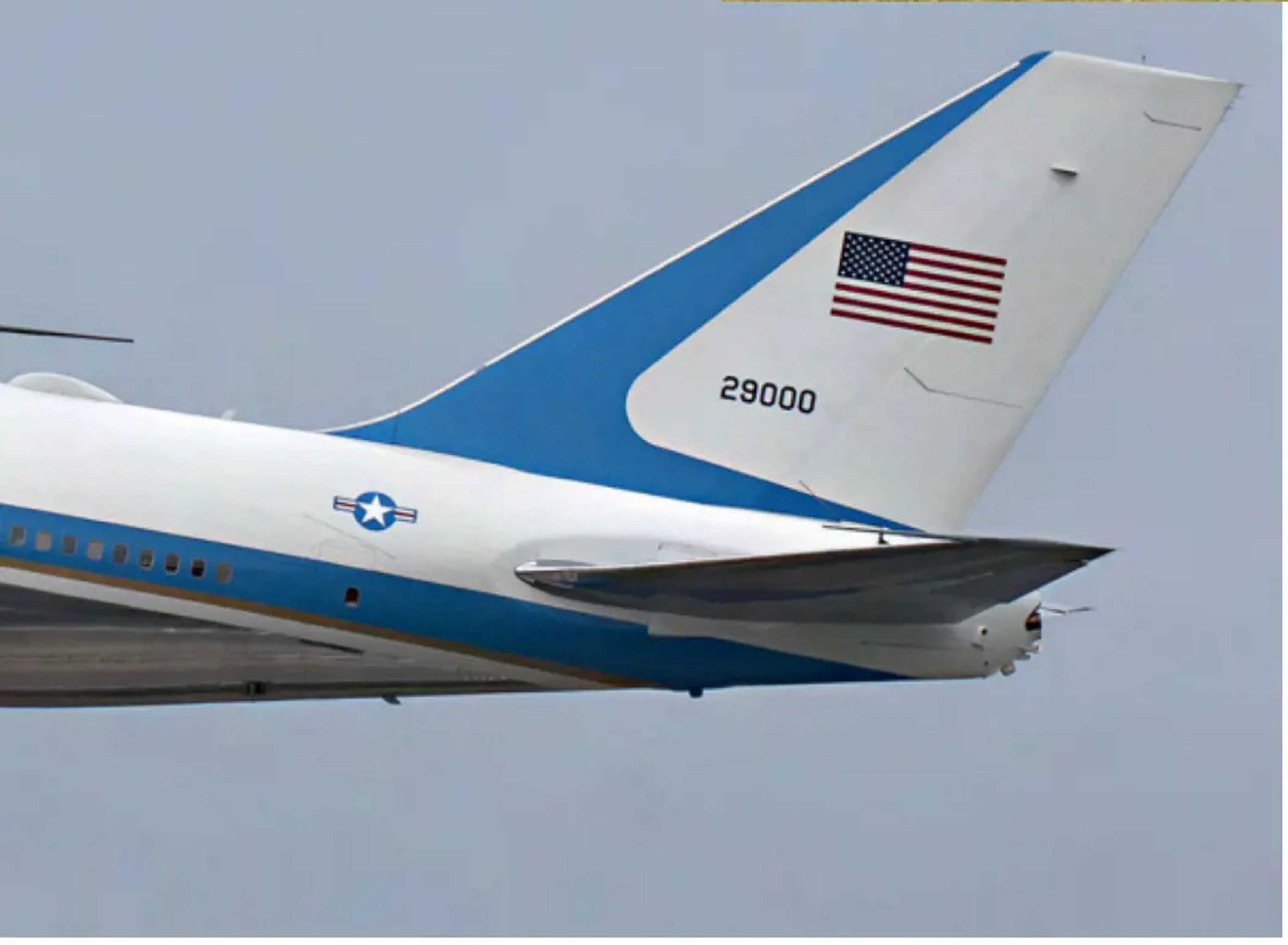
Above right: ***Royal Netherlands Navy NH-90NFH, N-175, arriving for a fuel stop at RAF Waddington on May 29. It is believed the aircraft was en route to a Royal Netherlands Navy vessel, either the HNLMS Tromp or HNLMS De Ruyter in the Irish Sea.N-175 belongs to 860 Squadron and wears a shark emblem on its port side with 'De Ruyter 2025', suggesting the aircraft is assigned to the HNLMS De Ruyter*** *Mike Hiley*



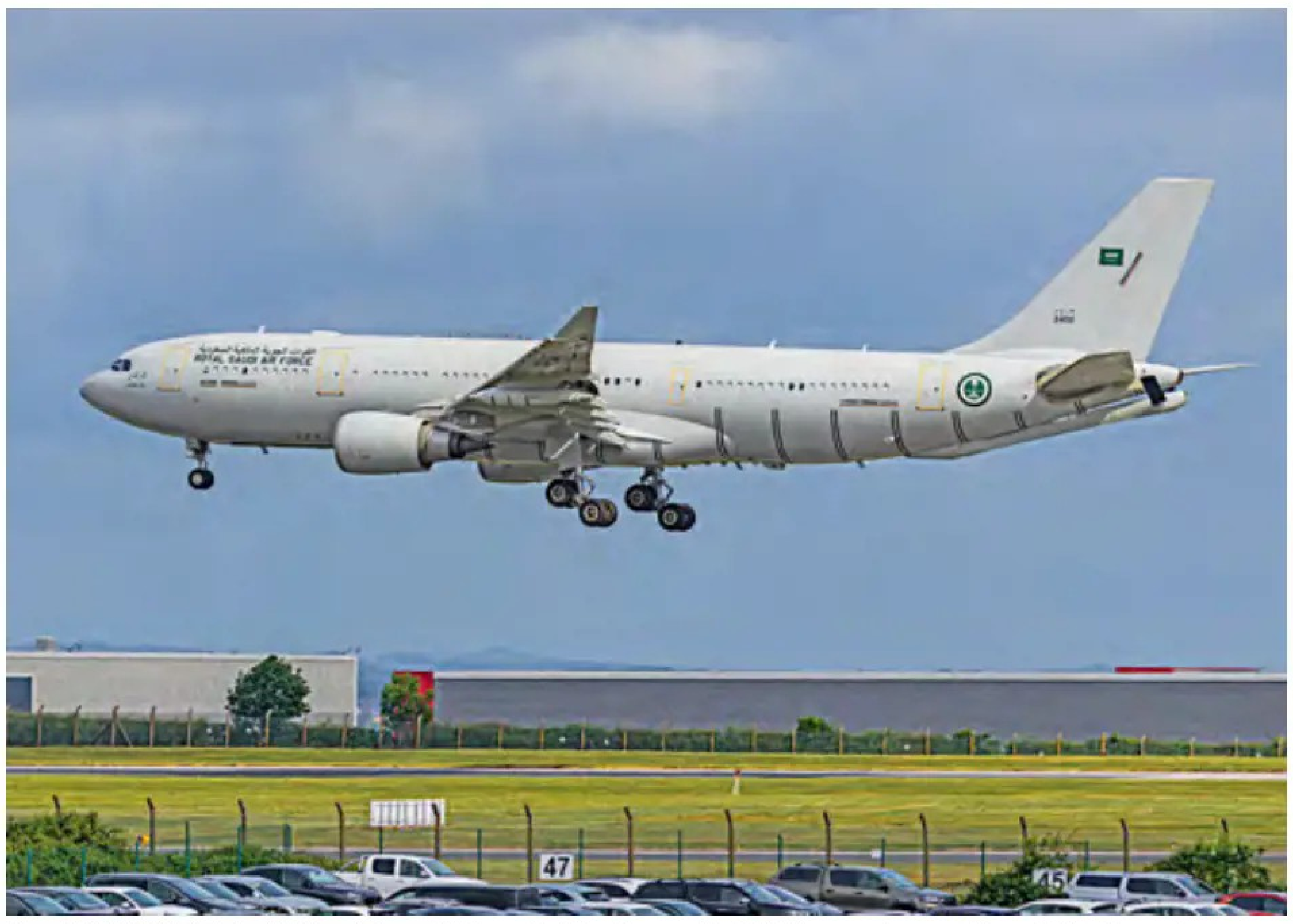
Rihgt: ***Royal Canadian Air Force CP-140 Aurora, 140113, about to touch down on Prestwick's Runway 30 for an overnight stay on May 30, arriving from CFB Greenwood as 'CFC491'*** *Rolf Jonsen*



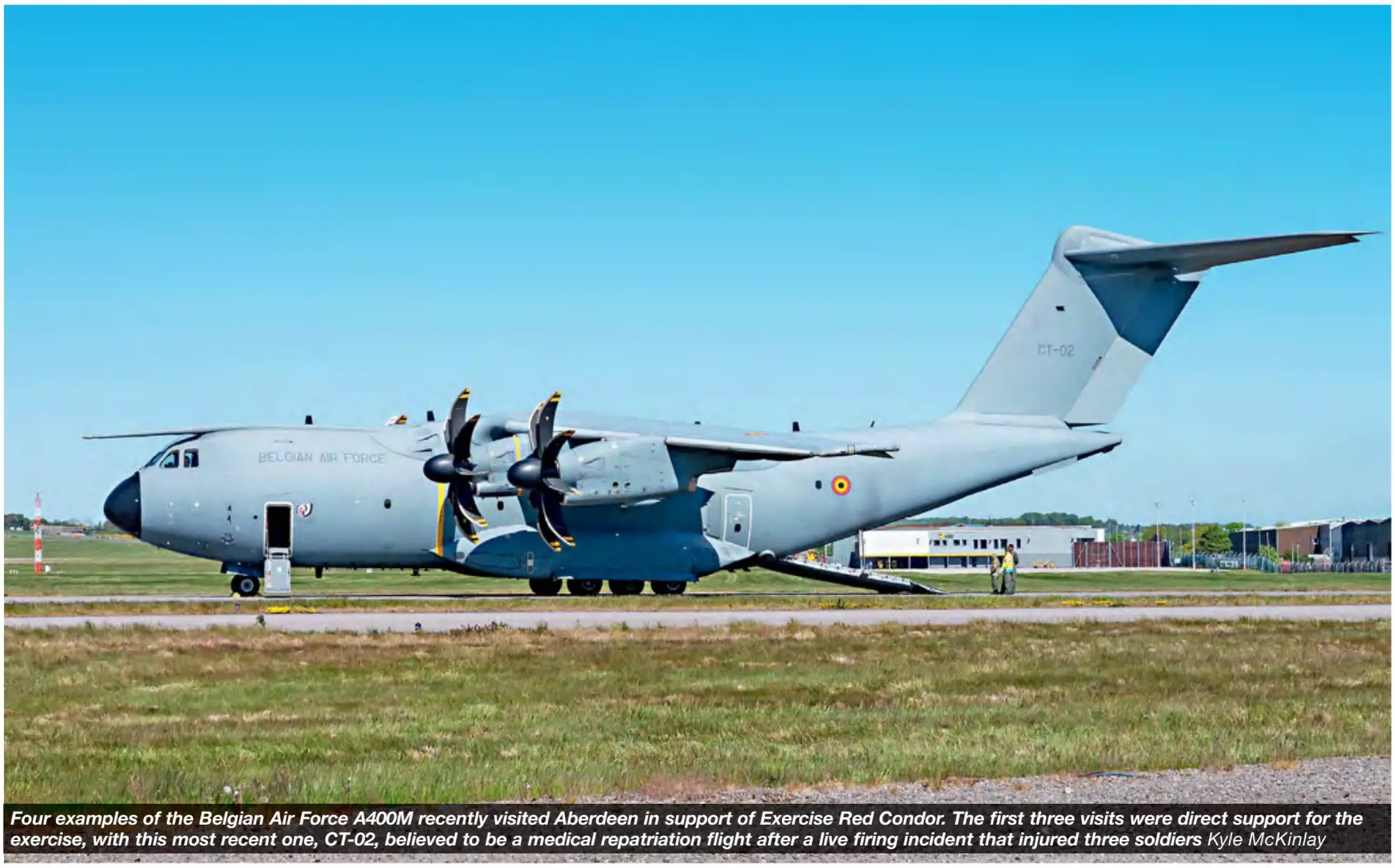
Royal Saudi Air Force E-3A Sentry, 1802, belonging to 18 Squadron, arrived at RAF Mildenhall using the callsign 'RSF9005'. It arrived on May 26 and departed on May 28 for Bangor, Maine *Karl O'Kane*



VC-25A, 92-9000, using the callsign 'Air Force One', is seen departing RAF Mildenhall on the evening of May 15 en route to Joint Base Andrews, Maryland, after a fuel stop. The aircraft was on the ground for approximately 90 minutes. President Donald Trump was returning from his tour of the Middle East, which included visits to Saudi Arabia, Qatar and the UAE *Jay Carter*



An A330MRTT of the Royal Saudi Air Force's 24 Squadron about to touch down at East Midlands Airport as 'RSF9006' on May 26 *Adrian Webster*



Four examples of the Belgian Air Force A400M recently visited Aberdeen in support of Exercise Red Condor. The first three visits were direct support for the exercise, with this most recent one, CT-02, believed to be a medical repatriation flight after a live firing incident that injured three soldiers *Kyle McKinlay*

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Alan Warnes and **Dylan Eklund** report on the progress of *HMS Prince of Wales* aircraft carrier and its strike group on Operation Highmast

The Med and beyond

Following the departure of HMS *Prince of Wales* (R09) with much fanfare from HMNB Portsmouth on April 22, the Royal Navy flagship was joined by the other elements of Carrier Strike Group 25 (CSG 25) before passing through the Straits of Gibraltar and into the Mediterranean on April 29.

For the eight-month Operation Highmast to the Indo-Pacific, CSG 25 will include Type 23 frigate HMS *Richmond*, Type 45 air-defence destroyer HMS *Dauntless*, nuclear-powered attack submarine HMS *Astute* and Royal Fleet Auxiliary replenishment tanker RFA *Tidespring*. With the UK unable to mount a full CSG of its own volition, allied vessels joing the deployment comprise the Spanish Navy frigate SPS *Méndez Núñez*, Canadian frigate HMCS *Ville de Québec* and Norwegian replenishment oiler HNoMS *Maud* and anti-submarine frigate HNoMS *Roald Amundsen*.

First exercise

Once in the Med, command of CSG 25 chopped to NATO and participation in the longstanding Exercise Neptune Strike. The first of a series of deployments for Operation Highmast, Neptune Strike forms part of a mission to maintain security in the Euro-Atlantic region and preserve freedom of navigation.

This was swiftly followed by Exercise Med Strike in the Ionian Sea between Taranto and Sicily on May 5-11. Joint operations with the Italian Navy's ITS *Cavour* strike group saw UK F-35Bs from 617 and 809 Squadrons train with Italian AV-8B Harriers and F-35B Lightnings with scenarios including defending against drone attack.

Commodore James Blackmore, commander of CSG 25, commented: "This is a major moment in the UK Carrier Strike Group's global deployment and will test our skills alongside NATO allies in a region of fundamental importance to UK security. Working at the heart of a powerful NATO force sends a strong message and shows clearly the phenomenal capabilities that not only the UK possesses but the alliance as a whole."

Tidespring departs

On May 14, RFA *Tidespring* broke away from the flotilla to sail down the west coast of Africa and around the Cape of Good Hope, with a view to rejoining the CSG in the Indian Ocean. The support vessel is equipped with a Merlin HM2 anti-submarine warfare helicopter, one of six within the CSG. It is believed this was a consequence of RFA ships being civilian

Italian Navy AV-8B Harrier IIs launch from ITS Cavour during Exercise Med Strike. The Italian aircraft carrier is the flagship of the Italian Navy *Crown Copyright/AS1 Amber Mayall RAF*

Two of Europe's most powerful task forces teamed up for Exercise Med Strike from May 5-11. The Italian carrier strike group joined CSG25's 21 warships, three submarines, 41 fast jets, 19 helicopters, ten patrol aircraft and 8,000 personnel in the Ionian Sea *Italian Navy*

Typhoon FGR4s from 1(F) Sqn participated in Exercise Med Strike during May 5-11 in the waters between Taranto and Sicily. The drills were a test of air defence skills, including deterring aerial drone attacks *Crown Copyright/Cpl Samantha Drummee*

crewed, which poses insurance issues when sailing in the dangerous waters near Yemen.

A port call in Souda Bay followed for HMS *Prince of Wales*, which docked in Crete on May 14 for replenishment and to give the ship's complement their first run ashore. The next phase of the deployment will be passage through the Red Sea, with the threat of attack from Houthi rebels.

Akrotiri bolstered

As preparations were made for CSG25 to transit through the Suez Canal and Red Sea, the Royal Air Force deployed assets to RAF Akrotiri in late May to provide additional support and protection. The location of the RAF station in the eastern Mediterranean has always made it of important strategic value to the UK, a fact underscored by providing a secure operating location for additional support within a convenient flying distance of areas of concern.

After an abortive attempt the day before, four Typhoon FGR4s from 6 Squadron flew from RAF Lossiemouth to Akrotiri on May 15. This preceded an influx of four Voyager KC2/3s from RAF Brize Norton on May 20 to bolster the aircraft deployed in support of Operation Shader, resulting in six of the air-to-air refuellers on the ground at the Cyprus base.

The surge of additional Typhoons to Akrotiri was not formally disclosed by the UK Ministry of Defence until after the deployed Typhoons had struck Houthi rebel targets in Yemen. In the absence of any publicised pre-emptive strikes, they are presumed to have mounted combat air patrols as the CSG passed close to Yemen, ready to react in the event of hostile action against the carrier, escorts and support vessels.

Poseidons deploy

A pair of Poseidon MRA1s, ZP803 and ZP805, were also pre-positioned to Akrotiri from RAF Lossiemouth. The maritime patrol aircraft were tracked conducting patrols in the southern Mediterranean between Cyprus and Egypt in the days leading up to the transit. Although the Russian Navy lost access to the Tartus naval base in Syria earlier in the year, the Kilo-class diesel-electric attack submarine *Krasnodar* is reported to have entered the Mediterranean in May and was the most likely focus of attention.

This is believed to be the first time RAF Poseidons have deployed to Akrotiri on operations, although they are no strangers to the Mediterranean, operating primarily on exercise from NAS Sigonella in Sicily. In 2022, a pair of RAF P-8s were diverted from Exercise Dynamic Manta to track Russian assets following the invasion of Ukraine, which included the first visit by the type to Akrotiri.

The CSG passed through the Suez Canal on the night of May 23/24. Flight tracking data shows a spike in Voyager activity from May 25, suggesting air cover was provided as the carrier group came within range of Houthi forces. While an Oman-brokered ceasefire had been agreed between US President Donald Trump and the Houthis, the UK was seemingly not taking any chances.

Further afield, the RAF deployed a second RC-135W Rivet Joint to the Middle East on May 21, when ZZ666 flew from RAF Waddington to Al Udeid Air Base, Qatar. It joined fellow 51 Squadron aircraft ZZ665, which has been deployed to the base since April 17 and from where it has been tracked flying sorties into Iraq. It is unclear whether the intelligence-gathering aircraft will support the CSG when in the region, but they will be well placed to do so. **afm**

F-35 Lightnings on HMS Prince of Wales's flight deck as the ship arrives in Souda Bay, Crete, on May 14 for its first logistics stop during Operation Highmast *Crown Copyright/AS1 Amber Mayall RAF*

A close call

Babak Taghvaee looks at the role air power played in the May attacks by India on Pakistan and the latter's response

SQUADRON
15
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107
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A Pakistan Air Force J-10CP taxies out of its hardened aircraft shelter at PAF Base Minhas, the home of the 'Venomous Cobras'. It is equipped with two PL-10 short range air-to-air missiles on the wing tips and four very long-range PL-15s, which the PAF claims shot down five Indian Air Force fighters, India has confirmed three. *Awais Lali*

A terrorist attack on April 22, 2025, resulted in the deaths of 25 Indian nationals and one Nepalese civilian near Pahalgam, Jammu and Kashmir. In response to this act of terrorism, the Indian government took a series of significant actions, including suspending the Indus Waters Treaty, expelling Pakistani diplomats, and closing the borders. Subsequently, the Indian government issued an order for the Indian Air Force (IAF) to conduct retaliatory airstrikes.

On May 7, the IAF executed a series of precision airstrikes targeting nine facilities linked to three prominent Islamic terrorist organisations during an operation codenamed 'Sindoor'. The Pakistani Air Force (PAF), anticipating Indian counterstrikes, successfully engaged and downed at least three of the 75 Indian fighter aircraft involved in the operation, although Pakistan claims five, including the world's first combat loss of a Rafale multi-role fighter.

In the wake of these airstrikes, the Pakistan Army and Air Force initiated a counteroffensive, focusing on military targets within India. Utilising one-way attack drones, precision-guided rockets, and air-launched ballistic missiles, Pakistan's forces targeted Indian air defence systems, radar installations, and airbases located near the international border.

On May 9/10, in retaliation, the IAF launched a strike on 13 military installations within Pakistan, predominantly targeting assets associated with the PAF. This included the destruction or damage of a C-130 Hercules transport aircraft and a Saab 2000 airborne early warning and control (AEW&C) aircraft, along with the

The IAF's Rafale EHs formed the core of the strike force during Operation Sindoor during which they entered the Indian airspace to drop precision guided munitions on their targets which exposed them to the deadly PL-15s of the PAF's J-10CPs *Babak Taghvaee*

neutralisation of several early warning radars belonging to the Pakistan Army Air Defence Corps (PAADC). The escalating hostilities culminated in a ceasefire agreement brokered by the United States, which came into effect on May 10, effectively halting the immediate military actions between the two nations.

Pahalgam terrorist attack

For several decades, Pakistan has served as a sanctuary for numerous Islamist terrorist organisations. A complex interplay of political, ideological, and institutional factors has impeded the capacity – or willingness – of the Pakistan Armed Forces and security apparatus to effectively dismantle these militant groups. These organisations have not only perpetrated violence within Pakistan's own borders but have also conducted transnational terrorist operations in neighbouring countries, notably India and Iran. In response, both the Iranian and Indian armed forces have occasionally resorted to kinetic operations, including air, drone, and missile strikes against terrorist infrastructure within Pakistani territory. These cross-border strikes have consistently been condemned by Islamabad as violations of its sovereignty and often been followed by retaliatory actions from the Pakistani military.

On April 22, five armed militants affiliated with The Resistance Front (TRF), a proxy group of the Lashkar-e-Taiba (LeT) Islamic terrorist organisation, carried out a mass-casualty terrorist attack in Baisaran Valley, near Pahalgam in the Anantnag district of Jammu and Kashmir. Equipped with AK-47 assault rifles and M4 carbines, the attackers targeted a group of tourists, killing 26 individuals – including 25 Indian nationals and one Nepalese citizen – and injuring at least 20 others.

Prior to executing their victims, its reported the assailants reportedly interrogated the tourists, demanding their names and religious affiliations to distinguish Muslims from non-Muslims. This deliberate targeting strategy underscores the sectarian motivations behind the massacre. Among the deceased were three Indian government officials, including newlywed officers from the Indian Air Force and Indian Navy.

The atrocity provoked widespread public outrage across India and triggered an immediate escalation in diplomatic, economic, and military posturing against Pakistan.

In the wake of the attack, the Indian government implemented a series of punitive measures, culminating in a directive for IAF to execute retaliatory precision strikes. The responsibility for this counter-offensive Operation Sindoor was assigned to the IAF's Western and Southwestern Air Commands. At the time, these commands jointly fielded a force of approximately 251 combat aircraft distributed across 18 squadrons within 11 operational wings and one forward operating base. The operation began on May 7.

Operation Sindoor

According to official sources in the IAF, Operation Sindoor involved the deployment of approximately 75 to 80 combat aircraft. PAF reporting indicated that the strike package primarily consisted of Rafale EHs, Su-30MKI *Flankers*, and MiG-29UPG *Fulcrums*. The Southwestern and Southern Air Commands of the IAF collectively operated an inventory of approximately 207 fourth-generation fighter jets (Rafale EHs, Su-30MKIs, and MiG-29UPGs) with an estimated 141 of them reported as operationally airworthy at the time of the mission.

Additionally, the 40 Wing of the IAF's Central Air Command, stationed at Maharajpur Air Force Station (AFS), maintained a Quick Reaction Alert (QRA) detachment of four Mirage 2000HIs at Leh AFS, operating under the Western Air Command in proximity to the Line of Control (LoC) with Pakistan.

According to PAF assessments, Operation Sindoor comprised five principal strike formations: three four-ship formations of Rafale EHs, one four-ship formation of MiG-29UPGs, and one four-ship formation of Su-30MKIs. The MiG-29UPGs and Su-30MKIs were launched from Srinagar AFS, while the Rafale EHs originated from Ambala AFS.

In parallel with the strike package, additional Su-30MKIs and MiG-29UPGs conducted Combat Air Patrol (CAP) missions over Indian airspace. These aircraft were supported by aerial refuelling from Il-78MKI tankers of 78 Squadron and Airborne Early Warning & Control (AEW&C) coverage provided by A-50EI aircraft of 50 Squadron, both operating out of Agra AFS under the Central Air Command.

On the Pakistani side, at least one aircraft from each of the PAF's Saab 2000 AEW&C squadrons was airborne at the time of the Indian incursions – one from 3 AEW Squadron operating out of Minhas Air Base, and another from 53 AEW Squadron deployed from Bholari AB.

The Pakistani Saab Erieye AEW&C platforms played a critical role in providing comprehensive situational awareness to PAF assets. These included an undisclosed number of J-10CP and JF-17C Block III multirole fighters conducting CAP missions over Pakistani airspace. Upon detecting inbound Indian aircraft and their stand-off munitions via both airborne sensors and land-based early warning radars, AEW&C crews vectored J-10 and JF-17 units to intercept. Additionally, further interceptors were scrambled to engage the intruding aircraft and neutralise any incoming precision-guided munitions.

The 220 Squadron of the IAF's 34 Wing at Halwara AFS is one of three units of the Western Air Command operating Su-30MKI-3 multirole fighter jets which took part in Operation Sindoor on May 7 and retaliatory strikes at Pakistani military sites on May 9/10. One of its Su-30MKI-3s can be seen here *Tarao Goo*

Five of the IAF C-17As played an important role in airlifting military equipment and personnel between IAF air bases ahead of ***Operation Sindoor*** *Babak Taghvaee*

Indian Rafale EH shot down

According to statements released by the PAF, five Indian fighter aircraft – comprising three Rafale EHs, one Su-30MKI, and one MiG-29UPG – were reportedly downed during the IAF offensive on May 7. However, post-strike open-source intelligence (OSINT), including civilian-recorded videos and photographic evidence circulated by Indian media outlets, confirmed the loss of three aircraft: one Rafale EH (BS001), one Su-30MKI, and one MiG-29UPG, all within Indian airspace.

Initially, several Indian media platforms misidentified the wreckage as belonging to Pakistani fighter jets and published the imagery on May 7. Once the wreckage was definitively attributed to IAF assets, the narrative shifted. Facing public scrutiny and potential reputational damage, Indian media outlets began denying the losses – particularly the downing of the Rafale EH, which was widely regarded as the most advanced combat aircraft in India's inventory.

PAF sources attributed all confirmed kills to PL-15 active radar homing long-range air-to-air missiles (ARH LRAAMs), launched by Chengdu J-10CP multirole fighters of 15 Squadron, the 'Venomous Cobras'. This squadron is a component of the PAF's 33rd Tactical Wing based at Minhas AB in Kamra. Contrary to Indian expectations, these J-10CPs were reportedly equipped with the non-export variant of the PL-15 missile, featuring an extended engagement envelope of 125-155 miles significantly greater than the commonly assumed export range of 75-90 miles.

This enhanced missile capability allowed a J-10CP to successfully engage and destroy the fourth aircraft in the third Rafale EH formation, identified by the callsign 'Godzilla 4'. The Rafale was struck over Akali Khurd, a village near Bathinda, approximately 44 miles from the India–Pakistan border, while en route back to Ambala Air Force Station (AFS), home to a key wing of the IAF's Western Air Command.

The PL-15, with its Mach 5+ velocity and extended range, enabled successful beyond-visual-range (BVR) engagement. In addition to the Rafale EH, other PL-15 missiles were credited with kills against a MiG-29UPG and a Su-30MKI. Several additional missiles were launched during the engagement but failed to hit their intended targets. After exhausting the solid propellant in their rocket motors, these failed munitions fell in various regions across western India.

The Indian Armed Forces reportedly recovered some of the missile debris, which is believed to have been subjected to technical exploitation for intelligence and countermeasure development.

A video recorded by a local farmer in Akali Khurd village captured the final moments of the Indian Air Force Rafale EH (tail number 'BS001'), seconds after it was struck by a PL-15 long-range air-to-air missile on May 7. The footage shows the aircraft in an uncontrolled descent, crashing shortly thereafter, while its self-protection suite actively deployed flares in a last-ditch defensive effort even after its pilot had ejected. The deployment pattern suggests a state of confusion or delayed response – either by the pilot or the aircraft's defensive avionics – in identifying the nature and trajectory of the incoming threat.

The Rafale's defensive suite, SPECTRA (Self-Protection Equipment to Counter Threats for Rafale Aircraft), is a multi-spectral integrated electronic warfare system developed by Thales Group. It has been widely promoted by Dassault Aviation as one of the most advanced self-protection systems in service aboard any fourth- or fifth-generation combat aircraft. SPECTRA combines radar warning receivers (RWR), laser warning receivers (LWR), missile approach warning systems (MAWS), and active jamming capabilities into a highly automated and networked defensive architecture.

Despite its sophisticated design, SPECTRA failed to protect Rafale EH 'BS001' from the PL-15 missile engagement that night. The exact reason for this failure remains undetermined. Possible explanations include successful electronic warfare countermeasures by the Pakistan Air Force, the advanced seeker and high speed of the

BrahMos-A and its extended range variant are currently the Su-30MKI's deadliest stand-off weapons. Here a BrahMos ER is loaded on a IAF Su-30MKI-3 (SB226) prior to its first successful test launch *Indian Air Force*

During the Operation Bunyan al-Marsous, JF-17 Block IIs of the PAF's 14 'Tail Choppers' Squadron, based at Rafiqui AB, conducted SEAD operation against the IAF's S-400 SAM batteries using CM-400AKG hypersonic air-to-surface missiles on May 10 *Babak Taghvaee*

The IAF's fleet of four Il-78MKI tankers are currently experiencing problems associated with their age and high flying hours and cycles. During Operation Sindoor, at least two were airborne over central India refuelling the combat aircraft on CAP duty *Indian Air Force*

PL-15 missile itself, or a technical malfunction within the Rafale's onboard defensive suite. The incident has raised critical questions regarding the operational effectiveness of self-protection systems in high-threat environments against emerging long-range air-to-air missile technologies.

Operation Sindoor targets

Despite the confirmed loss of three combat aircraft, Operation Sindoor was widely regarded as a strategic success by the Indian Armed Forces in their ongoing counter-terrorism campaign against Pakistan-based militant organisations. Following the cessation of hostilities, the Indian government held a press briefing during which it revealed that nine high-value targets had been destroyed during the airstrikes on May 7. These targets were affiliated with three major jihadist groups operating from Pakistan: Lashkar-e-Taiba (LeT), Hizb ul-Mujahideen (HM), and Jaish-e-Mohammed (JeM). According to official Indian accounts, three of the targeted facilities were operated by LeT, one by HM, and five by JeM.

The LeT-affiliated targets included the Shawai Nallah Terrorist Training Camp in Muzaffarabad, located within Pakistan-occupied Jammu and Kashmir (PoJK); the Markaz Ahle Hadith in Barnala, PoJK; and the Markaz Taiba Training Centre in Muridke, Punjab. The latter two locations, while publicly functioning as mosques and religious seminaries, were identified by Indian intelligence as ideological indoctrination centres and operational hubs used by LeT to prepare suicide bombers and other militant cadres.

According to Indian sources, these facilities played a central role in the recruitment, radicalisation, and religious training of operatives deployed for cross-border terrorist activities.

The Pakistan government strongly contested these characterisations, claiming that the targeted sites were merely religious institutions and civilian facilities. However, no verifiable evidence was provided to substantiate those claims. Indian officials countered this narrative by highlighting that, although the Pakistani authorities had reportedly issued evacuation orders for religious seminaries in the days leading up to the operation, all the identified targets remained active and occupied at the time of the airstrikes.

On May 8, Indian Defence Minister Rajnath Singh announced that the strikes had

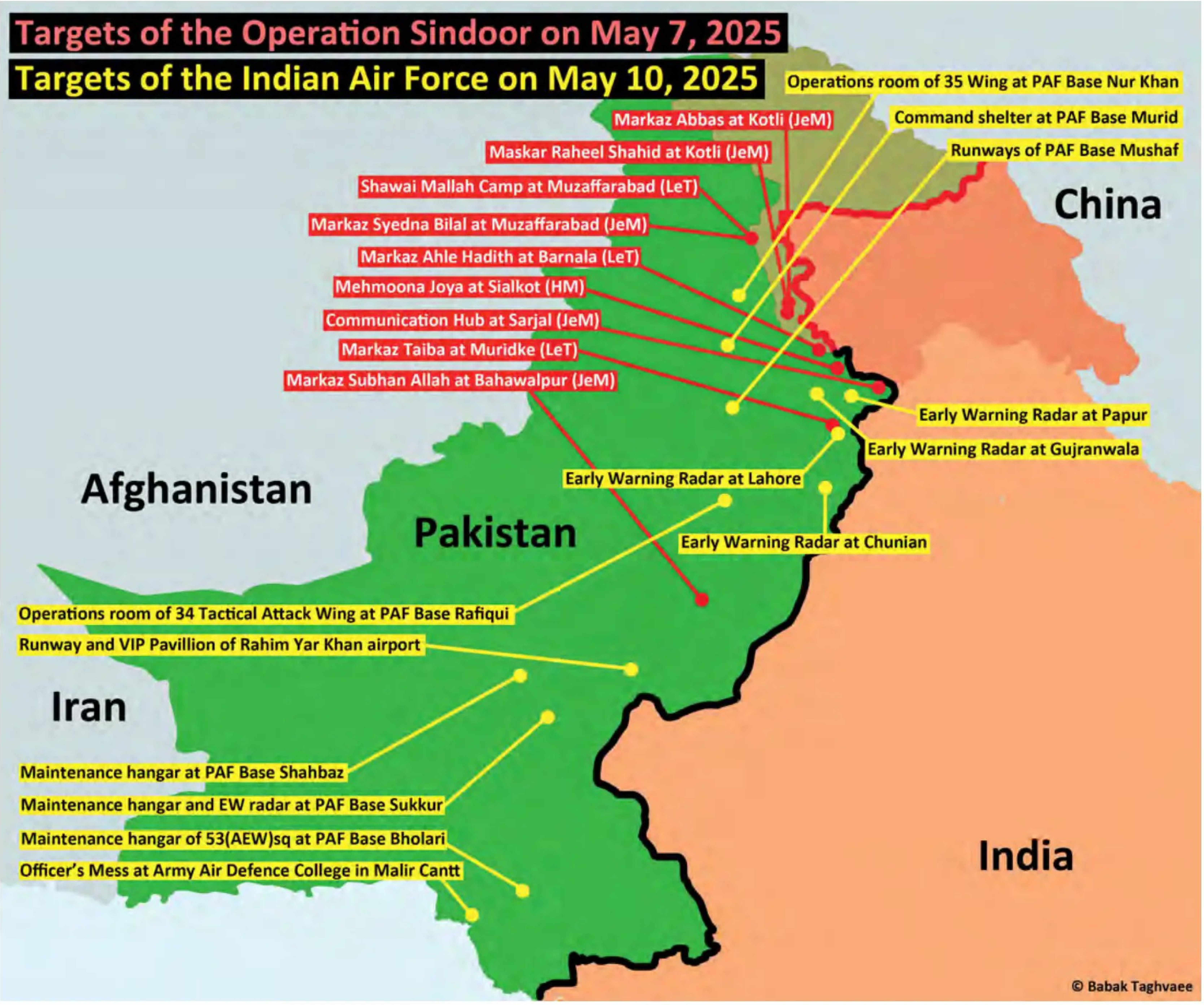
Last year the IAF's MiG-29UPGs participated in a large-scale multinational exercise named Tarang Shakti-24 which played an important role in increasing air-to-ground skills *Indian Air Force*

All of the IAF's MiG-29UPGs are based in the western and southwestern areas of India to protect the country during any war with Pakistan. Their serviceability is reported to be around 60%, meaning 37 out of 52 of them are airworthy simultaneously RAC MiG

neutralised at least 100 militants affiliated with the aforementioned terrorist organisations. Conversely, the Pakistan government asserted that 31 civilians were killed and denied the presence of militants at any of the targeted locations. This significant discrepancy in casualty figures illustrates the ongoing contest between both nations in the domain of information warfare accompanying the kinetic phase of Operation Sindoor.

Pakistan's Operation Bunyan al-Marsus

In the immediate aftermath of Operation Sindoor, the Pakistan Armed Forces initiated a multi-domain retaliatory campaign that began with intensified artillery bombardments, mortar fire, and anti-tank guided missile (ATGM) strikes against Indian Army positions along the Line of Control (LoC) in Jammu and Kashmir. These initial kinetic actions were followed by night-time


Targets of the Operation Sindoor on May 7, 2025
Targets of the Indian Air Force on May 10, 2025
Operations room of 35 Wing at PAF Base Nur Khan
Command shelter at PAF Base Murid
Runways of PAF Base Mushaf
Markaz Abbas at Kotli (JeM)
Maskar Raheel Shahid at Kotli (JeM)
Shawai Mallah Camp at Muzaffarabad (LeT)
Markaz Syedna Bilal at Muzaffarabad (JeM)
Markaz Ahle Hadith at Barnala (LeT)
Mehmoona Joya at Sialkot (HM)
Communication Hub at Sarjal (JeM)
Markaz Taiba at Muridke (LeT)
Markaz Subhan Allah at Bahawalpur (JeM)
China
Early Warning Radar at Papur
Early Warning Radar at Gujranwala
Early Warning Radar at Lahore
Early Warning Radar at Chunian
Afghanistan
Pakistan
Operations room of 34 Tactical Attack Wing at PAF Base Rafiqui
Runway and VIP Pavillion of Rahim Yar Khan airport
Iran
Maintenance hangar at PAF Base Shahbaz
Maintenance hangar and EW radar at PAF Base Sukkur
Maintenance hangar of 53(AEW)sq at PAF Base Bholari
Officer's Mess at Army Air Defence College in Malir Cantt
India
© Babak Taghvaee

The location of targets destroyed by the IAF during Operation Sindoor on May 7 and the Pakistani military targets destroyed on May 9/10 Babak Taghvaee

J-10CPs and JF-17s: The PAF's Key Weapons

As of late May, the PAF maintained a fleet of 474 fighter aircraft and advanced jet trainers. Among these, 67 platforms were allocated to training and doctrinal development units, including four Operational Conversion Units (OCUs), one Lead-In Fighter Training Squadron, and three Combat Commanders Schools (CCSs). The remainder were distributed among the PAF's operational units, comprising nine multirole fighter squadrons, two air superiority squadrons, and four tactical attack squadrons.

During this latest Indo-Pakistani conflict, the PAF faced significant operational constraints regarding the deployment of its 62 F-16 multirole fighters. These included 12 F-16C and six F-16D Block 52 variants, which represent the most advanced Western-origin combat aircraft in Pakistan's inventory. Owing to end-use monitoring clauses imposed by the United States as part of the foreign military sale agreement, these aircraft are restricted to counter-terrorism missions and could not be employed in conventional combat against the IAF.

Furthermore, the PAF's older Mirage III and Mirage V aircraft, assigned to its four tactical attack squadrons, were of limited use in the air-to-air domain. These legacy platforms continue to serve primarily in ground-attack making them unsuitable for contesting air superiority against modern IAF fighters. As a result, the responsibility for countering IAF incursions fell almost exclusively to the PAF's Chinese-origin fourth-generation fighters – specifically the JF-17 and J-10CP platforms.

By mid-May, the PAF operated a total of 201 JF-17 series fighters, consisting of 50 JF-17 Block I aircraft (some undergoing modernisation to Block III standard), 55 JF-17 Block IIs, 50 JF-17 Block IIIs, 26 twin-seat JF-17B Block IIs, and 20 Chengdu J-10CP multirole fighters. These platforms were pivotal during the May hostilities, particularly the JF-17 Block II/III and J-10CP variants equipped with the PL-15 active radar-guided long-range air-to-air missile. These aircraft contributed significantly to the PAF's ability to secure its own airspace and defend critical strategic and military infrastructure. Their effectiveness compelled the IAF to revise its operational strategy following Operation Sindoor, shifting from the use of precision-guided bombs delivered by manned aircraft to the employment of long-range stand-off cruise missiles such as the SCALP-EG and BrahMos-A.

On the eve of Operation Sindoor, the Indian Air Force fielded a total of 531 fighter aircraft. This force structure included 52 MiG-29UPGs, 32 MiG-21 Bisons, 38 Tejas LCA Mk.1s, eight Jaguar IMs, 78 Jaguar ISs, 36 Mirage 2000HIs, 259 Su-30MKIs, and 28 Rafale EHs. Additionally, the IAF maintained a substantial inventory of combat trainer aircraft that could be deployed operationally if required: six MiG-29UBUPGs, four MiG-21UMs, three Tejas LCA-T Mk.1s, 27 Jaguar IBs, ten Mirage 2000THIs, and eight Rafale DHs.

Despite this expansive inventory, the IAF, like its Pakistani counterpart, selectively employed only a subset of its fleet for offensive operations during the conflict. Operations targeting Pakistani terrorist infrastructure were carried out exclusively by MiG-29UPG, Su-30MKI, and Rafale EH aircraft assigned to the Western and South-Western Air Commands. As of May 7, these commands had 52, 140, and 15 aircraft of those respective types in service, with estimated combat-ready figures at 37 MiG-29UPGs, 91 Su-30MKIs, and 13 Rafale EHs. A minimum of 75 of these participated in Operation Sindoor, of which three were confirmed as combat losses –one MiG-29UPG, one Su-30MKI, and one Rafale EH.

While there is a high probability that the PAF may have incurred aircraft losses during aerial engagements, particularly given the intensity of the air battles and volume of deployed missiles, there is currently no verified visual or forensic evidence available to confirm the downing of any PAF aircraft during the May 2025 conflict.

precision missile attacks, launched using the Pakistan Army's Badr rocket artillery systems. Concurrently, the Pakistani military deployed one-way attack drones most notably the Turkish-manufactured Yiha-III – to strike multiple Indian Air Force (IAF) air defence and radar installations across the Jammu and Kashmir region.

The escalation culminated on May 10, when the Pakistan Air Force (PAF) was ordered to execute a co-ordinated retaliatory air campaign, codenamed Operation Bunyan al-Marsus, a name derived from a Quranic verse symbolising fortified resistance. The primary objective of this operation was the disruption of IAF infrastructure and operational readiness, with particular emphasis on airbases and associated logistical nodes near the Indo-Pakistani border.

During this operation, PAF JF-17 multirole fighter aircraft launched stand-off munitions, including air-launched cruise missiles, targeting several critical Indian military installations. These included Udhampur Air Force Station (AFS), Adampur AFS, Pathankot AFS, as well as three weapon storage facilities located in Uri, Nagrota, and Beas.

Among the targeted airbases, Adampur AFS holds strategic significance as the operational base for No 47 Squadron of the IAF, which flies 18 MiG-29UPG fighters and two MiG-29UBUPG trainer variants. Pathankot AFS, under the Western Air Command, hosts the 125 Helicopter Squadron operating AH-64E Apache Guardian attack helicopters. The base had also recently received deployments of HAL Tejas Light Combat Aircraft (LCA) from various squadrons. Udhampur AFS, meanwhile, is home to the 153 Helicopter Unit operating Mi-17 utility helicopters, and the 132 Forward Aerial Control Flight, which flies HAL Cheetah light utility helicopters.

As part of the broader operation, the PAF also conducted a Suppression of Enemy Air Defences (SEAD) mission involving a JF-17 Block II aircraft from 14 Squadron, known as the 'Tail Choppers', based at Rafiqui Air Base. Two CM-400AKG hypersonic air-to-surface missiles targeted an Indian S-400 Triumf long-range surface-to-air missile (SAM) system stationed at Adampur AFS. Subsequent low-resolution satellite imagery analysed by independent defence observers revealed evidence of burn marks and localised ground disturbance at the suspected S-400 site, suggesting the missiles may have struck or degraded key components of the battery.

India's final response

In direct response to Operation Bunyan al-Marsus, the IAF launched a series of co-ordinated airstrikes targeting multiple strategic military assets in Pakistan. These retaliatory strikes were executed with precision, focusing on degrading Pakistan's air defence capabilities and operational

The PAF's JF-17 Block IIs of the 2(MR)sq based at Masroor AB played an important role during the recent Indo-Pakistani conflict. They can be seen during exercise Bright Star-23 in Egypt on September 14, 2023 *USAF/SSgt Emily Farnsworth*

The PAF's 9(MR) Sqn at Mushaf Air Base flies F-16A/F-16B MLUs, these three are pictured during Red Flag-10 in Nellis. None of them could be used in any classic war against India *USAF/A1C Daniel Phelps*

infrastructure. The targets included four early warning radar installations, seven PAF air bases, and one forward operating base. Preceding the main strike package, the Indian Armed Forces deployed a wave of one-way loitering munitions –specifically Israeli-made IAI Harop and Polish Warmate 5.0 drones – against these facilities.

These drones served dual purposes: to probe and assess the reaction parameters of HQ-9BE short-range SAM systems, and to neutralise or degrade the target acquisition and illumination radars of HQ-16FE medium-range SAM systems. This preparatory tactic weakened the defensive envelope of the targeted sites, thereby facilitating the success of the subsequent cruise missile strikes.

On May 9/10, Su-30MKI multirole fighter aircraft of the IAF launched between 15 and 18 BrahMos-A air-launched ramjet supersonic cruise missiles – typically one per aircraft – against strategic targets in northern and central Pakistan. These strikes inflicted considerable damage.

At PAF Base Nur Khan, a missile strike hit the operations room of the 35 Composite Transport Wing and destroyed two fuel trucks, with collateral damage sustained by at least one C-130 Hercules medium-lift tactical transport aircraft belonging to 6 Air Transport Squadron.

Additional BrahMos missiles targeted a command shelter at the PAF's Unmanned Aerial Vehicle (UAV) base in Murid, the main runways of PAF Base Mushaf, and the operations room of the 34 Tactical Air Wing at PAF Base Rafiqui. Further strikes were executed against Pakistan Army Air Defence Corps (PAADC) early warning radar installations in Papur, Gujranwala, Lahore, and Chunian.

Simultaneously, Rafale EH aircraft from 17 Squadron conducted long-range stand-off strikes employing at least ten SCALP-EG (Système de Croisière Autonome à Longue Portée – Emploi Général) air-launched cruise missiles, targeting sites across southern Pakistan. Although one missile reportedly failed en route due to engine malfunction, the remaining missiles achieved significant operational impact. Confirmed targets included the runway and VIP pavilion at Rahim Yar Khan Airport, an aircraft maintenance hangar at PAF Base Shahbaz, another hangar and an electronic warfare (EW) radar installation at PAF Base Sukkur, the maintenance hangar of 53 AEW Squadron at PAF Base Bholari, and the Officers' Mess at the Army Air Defence College in Malir Cantonment, Karachi.

Crucially, learning from the operational setbacks of Operation Sindoor, the IAF adopted a risk-averse posture in this wave of strikes. By employing long-range stand-off weapons – SCALP-EG with a maximum range of 340 miles and BrahMos-A with a 330 miles reach, the IAF avoided exposing its strike aircraft to the JF-17 and J-10CP platforms of the PAF, which were equipped with PL-15 active radar-guided long-range air-to-air missiles.

Furthermore, the prior deployment of loitering munitions had allowed the IAF to assess the vulnerabilities and reaction thresholds of various PAADC-operated SAM systems, ensuring that the main wave of cruise missile attacks faced minimal effective resistance.

Following three days of hostilities, both India and Pakistan jointly announced a ceasefire agreement, effective from 1700hrs local time on May 10. Formal diplomatic talks began on May 12. Despite the declaration, both sides accused each other of ceasefire violations in the immediate aftermath. In an unexpected diplomatic twist, US Vice President JD Vance dismissed the conflict as "none of our business," while President Donald Trump publicly claimed on social media that the United States had played a direct role in brokering the ceasefire. While the Pakistani government acknowledged US mediation efforts, Indian officials maintained that the agreement was the result of direct bilateral negotiations without third-party involvement. **afm**

COMING SOON

Further analysis on how the Pakistan Air Force managed to shoot down the IAF aircraft will appear soon

One of the 12 F-16C Block 52 Fighting Falcons assigned to the 5th Multirole Squadron at Rafiqui AB prepares for take-off at Nellis AFB during Red Flag 16-4 on August 17, 2016. These are the PAF's most advanced American-made fighter jets *USAF/TSgt Frank Miller*

Away the AWACS

In an exclusive interview, Lieutenant Colonel Rob 'Bruce' van Leeuwen, tactical director with NATO AWACS, tells Ben Gorski of recent changes to the fleet's area of responsibility

The Russian invasion of Ukraine in 2022 brought about a significant shift in European security, placing strategic air surveillance in a new geopolitical context. In response, NATO is strengthening its capabilities with the Airborne Warning and Control System (AWACS) fleet playing a key role in the alliance's defence. These advanced airborne radar platforms now serve as critical observation posts along the eastern flank.

"We demonstrate collective readiness in the region" according to Lieutenant Colonel Rob 'Bruce' van Leeuwen, tactical director of NATO AWACS operations.

Special attention to the Baltics

The continuous surveillance missions are conducted under the enhanced vigilant activities (eVA) framework, which allows NATO to maintain a steady presence.

The operational area for AWACS missions has expanded significantly and now stretches from the Arctic Ocean to the Mediterranean, with special attention to the Baltic region. Co-operation with unmanned aerial vehicles further enhances these capabilities. As van Leeuwen explained: "In our operations, we incorporate information from MQ-4s operated by the alliance ground surveillance (AGS) unit based in Sigonella. In addition, MQ-9s operated by several nations contribute to our missions from national command structures. These remotely piloted aircraft have wingspans comparable to commercial airliners and offer significant additional reconnaissance capacity."

According to van Leeuwen, Russian activities in the airspace follow specific patterns that require careful analysis: "Their activity generally remains within legal boundaries but is often provocative. Our primary task is detecting behavioral deviations indicating a potential threat."

While operating in Polish airspace, an E-3A AWACS observes hostile aircraft and electronic signals using advanced radar and datalink systems. *All photos author*

> ***"The protection of underwater digital infrastructure has become a top-tier security priority."***

Colonel Henk Kiffen, deputy commander of NATO Air Base Geilenkirchen, commented: "NATO AWACS has proven its value over the past decades, but the war in Ukraine has shown that this capability is more important than ever. As Senior National Representative of the Dutch detachment, I am proud that we are making a meaningful contribution."

Monitoring ship activities

In addition to their primary role of air surveillance, AWACS aircraft regularly assist with Operation Baltic Sentry when operating in the area. This additional role includes monitoring maritime activities in the Baltic Sea, specifically protecting vital underwater infrastructure. The growing vulnerability of international data cables and gas pipelines, critical to Europe's economic security, prompted the creation of Baltic Sentry. The mission was launched following damage to key communication cables between Sweden, Finland and Estonia.

As van Leeuwen revealed: "Our surveillance systems detect discrepancies between electronic identification signals and actual radar contacts, which could indicate suspicious activities. The automatic

A NATO AWACS 'East Flank Defender' patch on a crew member's flight suit symbolises their crucial role of in defending NATO airspace

A US pilot operates an E-3 AWACS during a mission while the aircraft is subjected to electronic jamming

identification system (AIS) is a maritime counterpart of the military identification friend or foe (IFF) system, enabling us to compare transponder signals with radar detections. We often see manipulated position data."

Although not their core task, AWACS aircraft support P-8 Poseidon maritime patrol aircraft and naval ships in developing a complete surveillance picture when possible. "We are sometimes asked to observe specific areas when we're already nearby," van Leeuwen said.

According to Colonel Henk Kiffen, deputy commander of NATO Air Base Geilenkirchen, this supporting role highlights the flexible deployment potential of AWACS: "Where our operations used to be focused mainly on airspace surveillance, we can now incorporate maritime zones into our surveillance profile when the mission permits. The protection of underwater digital infrastructure has become a top-tier security priority."

F2T2: integrated air defense

In January 2025, NATO conducted an extensive international exercise over Poland and the Baltic states under the Find, Fix, Track and Target (F2T2) programme. This exercise demonstrated the alliance's integrated capability in environments with advanced threats. AWACS aircraft are essential to co-ordinate and detect hostile targets, sharing information between air and ground units.

Lasting more than ten hours, F2T2 combined multiple combat systems, including Eurofighter Typhoons, F-16s, F-35s and ground-based air defense units such as Patriot and NASAMS. As van Leeuwen revealed: "The most important aspect of the exercise is the seamless information exchange between various defensive systems. The scenarios also replicate real-life situations in which Russian strategic bombers test our response times by flying toward NATO airspace without active transponders. F2T2 enhances our capacity for early detection and effective response to potential threats."

One challenge during these operations is the increasing use of electronic warfare. The frequency of electronic interference, especially GPS jamming, has noticeably increased and these disruptions primarily originate from the Russian enclave at Kaliningrad, which houses advanced electronic warfare systems. Van Leeuwen explained the technical aspects of this issue:

On the taxiway of NATO AB Geilenkirchen, an E-3A AWACS is prepared for a long-duration surveillance mission

Lieutenant Colonel Rob van Leeuwen provides instructions to a colleague during an AWACS mission

"The effectiveness of electronic interference varies greatly. Due to its directional nature, satellite communication has a natural resistance to wide-area jamming. Effective jamming requires precise placement of the interference equipment in direct line with the communications antenna."

Strategic modernisation

NATO is implementing a strategic modification programme to upgrade the operational E-3 AWACS fleet. Based on designs from the 1970s and 1980s, these aircraft are nearing the end of their technical life. The radar systems struggle to detect stealth targets and fast missiles, while the Pratt & Whitney TF33 engines are increasingly challenging to maintain due to declining spare parts availability.

To maintain the operational relevance and deployability of the E-3A AWACS fleet until the expected introduction of the E-7A Wedgetail, NATO launched the Final Lifetime Extension Programme (FLEP), which focuses on upgrading the current aircraft by improving communications systems, operator consoles and data link capabilities. These enhancements enable the aircraft to operate more effectively in increasingly complex airspace and remain compatible with modern NATO networks. "The execution of FLEP began with retrofitting the first aircraft. We are in the mid-phase of this fleet modernisation," explained van Leeuwen.

A key component of FLEP is the upgrading of mission and command systems, enabling crews to detect threats more quickly and accurately and to co-ordinate more effectively with fighter aircraft and air defense systems. Security protocols are also being strengthened to guard against electronic warfare and cyber threats, a growing challenge in modern air operations.

The first E-3A to undergo the FLEP upgrade returned to Geilenkirchen on October 25, 2024, after extensive modernisation carried out by Leonardo in Tessera, Italy. Over the coming years, several AWACS aircraft will undergo this upgrade to provide NATO with reliable airborne command and control and situational awareness capabilities until 2035.

Extending endurance

The operational effectiveness of AWACS missions, which typically last 8-12 hours, depends directly on advanced air-to-air refuelling capabilities. This critical function ensures sustained presence over strategic observation zones.

On January 30, 2025, the legal office of the NATO Airborne Early Warning and Control Force (NAEW&CF), on behalf of SHAPE, signed a formal agreement with Luxembourg for additional refuelling support for NATO AWACS missions out of Geilenkirchen. This agreement significantly expands NATO's multinational tanker framework. If all goes according to plan, the multi-national multi-role tanker transport unit (MMU), operating primarily from Eindhoven, will begin providing regular AAR support to NAEW&CF missions with its A330 multi-role tanker transport (MRTT) capacity. This complements existing AAR training currently offered by rotating US Air National Guard units at NATO Air Base Geilenkirchen. In February 2025 the MMU received its ninth A330 MRTT airframe, with a planned final fleet of ten operational aircraft. This expansion will strengthen the alliance's operational flexibility and support various NATO partners, including Belgium, the Czech Republic, Germany, Luxembourg, the Netherlands and Norway.

Future vision

The upcoming E-7A Wedgetail, based on the Boeing 737, features advanced fixed radar antenna technology instead of the traditional rotating radar dome, providing improved detection capabilities and more efficient maintenance. This configuration offers enhanced performance against stealth targets in electronically contested environments. According to current NATO planning documents, the first operational introduction of the E-7A is expected between 2030 and 2031. "The expected entry into service of the E-7 is currently scheduled for 2031," confirmed van Leeuwen. Until 2035, the E-3A and E-7A systems will operate to ensure a smooth transition: "Operating both platforms simultaneously poses considerable personnel management challenges. The central question is how best to allocate qualified personnel during this transitional period. After transitioning to the E-7 platform, staffing levels will be adjusted accordingly."

The transition plan includes a phased personnel shift between aircraft types: "The personnel transition has various organisational implications. The structural organisation must be adapted to the fleet size and the different crew composition of the E-7 platform compared to the E-3 system. "This transition requires a gradual transfer of expertise: "We foresee a phased transformation in which the current training center is gradually phased out while E-7 training capacity is built up."

As military technology evolves, the question arises whether unmanned systems might eventually replace the functionality of AWACS aircraft. Van Leeuwen remains skeptical: "Since we need the AWACS capability in the short term, as our current fleet approaches the end of its service life, I believe it's safer and faster to acquire a proven off-the-shelf system."

Operational personnel on board guarantee continuous analytical capacity, regardless of communications status. Regarding artificial intelligence (AI), van Leeuwen remains pragmatic: "The expected implementation speed of AI capabilities in operational navigation and analysis systems has not yet reached anticipated levels. Many potential applications remain unexplored."

The best operational set-up for the foreseeable future remains an integrated architecture combining advanced technology and human expertise. Even after 2035, airborne radar systems will continue to serve as the alliance's strategic sensors, albeit with enhanced capability profiles **afm**.

US Air National Guard KC-135 tankers are regular visitors to NATO AB Geilenkirchen, deployed solely for training with E-3A crews.

NATO
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Operations in the north

Since the Russian invasion of Ukraine, NATO's fleet of 14 Boeing E-3A AWACS have played a crucial role in supplying its members and the Ukrainian armed forces with intelligence, as Babak Taghvaee reports

A KC-135R of the 121st ARW from the Ohio ANG refuelling a NATO E-3A over Poland in 2019 *US ANG/Tech Sgt Nic Kuetemeyer*

Around 150 personnel of NATO's E-3A component are on deployment at Šiauliai, Lithuania *NATO E-3A component*

One of two KC-135Rs of the 108th ARS (59-1500) seen landing at Geilenkirchen AB in April during the latest deployment of the US ANG's stratotankers *All photos, author unless stated*

Since April 23, 2025, NATO's E-3As have been conducting monitoring missions over the Eastern flanks of NATO from Šiauliai airport in Lithuania, rather than their home base in Geilenkirchen, Germany, or their forward operating bases in Turkey (Konya) and Greece (Aktion). Additionally, two other E-3As from Ørland in Norway participated in NATO's largest European naval drill, Formidable Shield-25.

NATO E-3As to Šiauliai

Considered high-value targets for enemy air forces during peacetime and wartime, AWACS aircraft are always kept far from conflict frontlines or borders with adversary nations. The NATO E-3As have been no exception, as their surveillance and monitoring sorties were typically launched from Germany or Turkey.

On September 28, 2023, the unit had deployed two of these aircraft to Šiauliai AB for the first time, along with a third arriving a day later. They were operated by 150 personnel to monitor Russian activities in or near Ukraine. History repeated itself on April 23, when two NATO E-3As, LX-N90442 and LX-N90443, were forward deployed to Šiauliai. The following day, LX-N90445 joined them.

For LX-N90442, the flight from Geilenkirchen to Šiauliai marked its first mission. The aircraft departed its home base at 0812hrs, flew over northern Poland at 31,000ft, monitoring Russian activities at Kaliningrad and the Baltic Sea, and landed in Šiauliai at 1217hrs. The following day, it conducted a sortie near Ukraine from 0246hrs to 0531hrs.

Another mission was carried out that day by LX-N90443 in Poland. It departed Geilenkirchen at 1005hrs and landed at Šiauliai at 1349hrs. These surveillance flights were also training exercises for the crew in preparation for their operations in Lithuania from April 25.

The third aircraft, LX-N90445, left Geilenkirchen on April 24 at 0940hrs and landed in Šiauliai at 1119hrs. It completed its first mission the next day from 0515hrs to 1025hr, then carried out another mission from 1415hrs to 1845hrs.

One of the key reasons for deploying the E-3As to Lithuania is the inability of the US Air National Guard (USANG) to deploy its KC-135Rs to Geilenkirchen to support operations. Unlike the French E-3Fs, which use CFM56-2A turbofan engines with a high bypass ratio, the E-3As still use old TF33-

> ***"One of the key reasons for deploying NATO's E-3As to Šiauliai during peacetime is the inability of the USANG to deploy its KC-135Rs to Geilenkirchen to support operations"***

E-3A LX-N90453 is one of two examples involved in NATO exercise Formidable Shield-2025.

PW-100A turbofans with a low bypass ratio and significantly higher fuel consumption. When operational intensity increases, this necessitates air-refuelling support from the A330-243MRTTs of NATO's Multinational Tanker Unit or similar aircraft from the French Air and Space Force (FASF). The USANG provides two KC-135Rs when needed.

This multi-week deployment of NATO's E-3As supports the agile combat employment (ACE) concept, enhancing resilience and operational flexibility across dispersed locations. Training in Lithuania enables NATO AWACS to respond quickly to evolving scenarios and strengthens co-operation with the host nation. The presence of AWACS in Šiauliai ensures operational continuity and demonstrates readiness.

Deployment to Ørland

The most recent deployment of two KC-135Rs from the USANG to Geilenkirchen AB was between March 31 and April 11. During this time, the 108th Air Refueling Squadron (ARS) of the Illinois Air National Guard's 126th Air Refueling Wing (ARW), based at Scott Air Force Base (AFB) in Belleville, Illinois, had two of its KC-135Rs (59-1500 and 63-7981) supporting weekly missions of E-3As over the Eastern flank of NATO and during exercise Ramstein Flag-25. This was necessary as the A330-243MRTTs of NATO were occupied with the same exercise and could not refuel the E-3As over Poland.

Initially, the USANG planned to again deploy two KC-135Rs to Geilenkirchen AB on April 28, using them to support NATO's E-3A missions until May 12. However, this was cancelled, leading NATO to forward deploy the three E-3As mentioned earlier to Šiauliai and two others – LX-N90444 and LX-N90453 – to Ørland AB in Norway on April 28 to participate in Exercise Formidable Shield 2025, as no tanker was available in Geilenkirchen to refuel them during the exercise.

The first E-3A arrived from Konya AB, Turkey, departing at 0640hrs and landing at Ørland at 1058hrs. The second flew from Geilenkirchen, leaving its home base

Keeping NATO's E-3As airworthy until 2035

Since 2021, the E-3A fleet has undergone its final and most crucial modernisation under FLEP. Leonardo and EADS were contracted by Boeing to carry out the upgrades of the aircraft during their programmed depot maintenance (PDM) at their facilities in Venice and Manching, respectively. The first aircraft, LX-N90459, arrived in Venice on April 11, 2022, and work lasted until August 6, 2025 when the first ground test was performed. After further corrections and maintenance, two functional check flights were conducted on September 14 and October 22, 2024, with the aircraft finally flying to Geilenkirchen on October 25, 2024. Since that time, it has been undergoing operational testing at its home base.

FLEP aims to maintain NATO's E-3As operative until 2035, when the first Boeing E-7A Wedgetail AEW&C aircraft of NATO's Air Command will be fully operational. The programme provides the multi-domain command and control (MDC2) capability required to meet the challenges of future operational environments, exploiting asymmetric advantages across air, land, sea, subsurface, space, and cyberspace to achieve the freedom of action required by the mission.

Developed by the NATO Airborne Early Warning and Control Force Program Management Agency (NAPMA), FLEP focuses on upgrading the tactical datalinks (TDL), secure communications, airborne networking, anti-jam communications, passive detection and mission systems. The aircraft's mission computing system has received new hardware and a significant change in software architecture. The new features and capabilities will alleviate capacity and processing constraints of existing technology that is ill-equipped to handle the massive amounts of data provided by organic and inorganic sensors.

As of May 2025, NATO had four more aircraft undergoing modernization in Germany and Italy. LX-N90446 and LX-N90452 have been in Venice since June 7, 2023, and February 29, 2024, respectively, while LX-N90447 and LX-N90451 have been at Manching since 2022 and 2024, respectively. Thanks to FLEP, the E-3As will continue to provide accurate and timely identification of air and surface targets, as well as gaining the ability to detect, track and identify ground targets and emitters through the ability to process off-board, ground-moving target indications (GMTI).

U.S. AIR FORCE
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KC-135R 63-7981 was involved in the operational deployment of USANG Stratotankers to Geilenkirchen between March 31 and April 11, 2025.

LX-N90459 is the first E-3A to undergo modernization under FLEP at the Leonardo facility in Venice, Italy. *US ANG/ Senior Master Sgt. Shawn Monk*

The five-month deployment of three NATO E-3As to Aktion-Preveza airport in Greece came to an end on April 16, 2025. *NATO's E-3A Component*

at 0752hrs and landing at Ørland around 1030hrs. Just a day after their arrival, LX-N90453 completed its first mission between 0923hrs and 1428hrs over the north of the country and the Norwegian Sea. A similar mission was carried out by LX-N90444 between 0715hrs and 1415hrs on April 30, while LX-N90453 flew to Geilenkirchen at 1009hrs and returned with a new set of crew at 1715hrs the same day.

Since 1983, NATO's E-3As have conducted missions out of Ørland, but the frequency of deployments to Norway decreased after the end of the Cold War. Then, in 2018, NATO started deploying its E-3As to Norway to participate in NATO exercises.

Running until May 31, Formidable Shield-25 is Europe's largest live-fire naval exercise in 2025, focusing on integrated air and missile defense (IAMD) using NATO command and control systems. The US Navy's Sixth Fleet led the exercise, with Naval Striking and Support Forces NATO (STRIKFORNATO) executing live-fire and IAMD events. Participants share tactical data, engage in NATO-level planning and practice co-ordinated responses to complex scenarios. The NATO E-3As are crucial in monitoring the airspace, contributing surveillance and tracking data to participants and monitoring any Russian military activities near the exercise areas.

The operational deployment of three E-3As to Lithuania and two to Norway has resulted in only LX-N90459 available at Geilenkirchen AB as of May 1. This is the first E-3A of NATO to undergo modernisation during the Final Lifetime Extension Programme (FLEP) with a total value of $1 billion.

As of May 1, 2025, NATO had four other E-3As undergoing the Final Lifetime Extension Programme (FLEP) during their programmed depot maintenance (PDM) or overhaul in the EADS facility in Manching Germany and at Leonardo in Venice, Italy. Additionally, four other E-3As were undergoing periodic inspections and organisational-level maintenance at Geilenkirchen, including LX-N90456, which was involved in the last five-month deployment of NATO's E-3As in Aktion, Greece. The aircraft returned to Germany on April 16, 2025, and underwent maintenance inspections. **afm**

NATO E-3A AWACS

S/N	C/N	Current Status	Delivery Date	Operating place in May 2025
LX-N90442	22855/945	Active	January 22, 1982	On deployment at Siauliai since April 23, 2025.
LX-N90443	22838/947	Active	May 19, 1982	On deployment at Siauliai since April 23, 2025.
LX-N90444	22839/949	Active	August 19, 1982	On deployment at Orland since April 28, 2025.
LX-N90445	22840/951	Active	November 12, 1982	On deployment at Siauliai since April 24, 2025.
LX-N90446	22841/953	Under modernization	March 10, 1983	Under modernization at Venice since June 7, 2023.
LX-N90447	22848/964	Under modernization	June 5, 1983	Under modernization at Manching since December 8, 2021.
LX-N90448	22843/956	Under repair	June 27, 1983	Under organizational level maintenance at Geilenkirchen since April 2, 2025.
LX-N90450	22845/959	Under modernization	October 12, 1983	Under modernization at Manching since June 15, 2023.
LX-N90451	22846/961	Under repair	January 20, 1984	Under organizational level maintenance at Geilenkirchen since September 12, 2024.
LX-N90452	22847/963	Under modernization	April 27, 1984	Under modernization at Venice since February 29, 2024.
LX-N90453	22848/964	Active	May 18, 1984	On deployment at Orland since April 28, 2025.
LX-N90454	22849/966	Under repair	November 2, 1984	Under organizational level maintenance at Geilenkirchen since February 19, 2025.
LX-N90456	22851/968	Under repair	November 17, 1984	Under organizational level maintenance at Geilenkirchen since April 16, 2025.
LX-N90459	22854/971	Passing tests	April 30, 1985	Passing post-modernization tests at Geilenkirchen since October 25, 2024.

THE ONCOMING STORM

The Royal Air Force has publicly acknowledged the introduction of its first Autonomous Collaborative Platform (ACP), revealing it to be a low-cost stand-in jammer to support suppression of enemy air defences (SEAD). **Richard Scott** reports

ROYAL AIR FORCE

Operated by 216 Squadron at RAF Waddington, Lincolnshire, the StormShroud ACP integrates Leonardo UK's BriteStorm stand-in jammer payload with the Tekever AR3 tactical uncrewed aerial system (UAS). The RAF achieved a minimum deployable capability on April 1 but waited until May 2 to publicise the milestone.

Chief of the Air Staff Air Chief Marshal Sir Rich Knighton said StormShroud was "the first of a new family [of ACPs] that will revolutionise our ability to fight and win."

ACP is the broad term used by the RAF to describe the class of uncrewed air platform which the US military calls collaborative combat aircraft or 'Loyal Wingmen'.

The RAF released its ACP Strategy in March 2024. The service's vision is that, by 2030, ACPs will be an integral part of the service's force structure, and routinely operating in conjunction with crewed platforms.

Stand-in jamming – one of a number of candidate ACPs use cases previously identified through operational analysis – is a SEAD technique/ploy that uses attritable uncrewed air platforms or launched effects to deliver an electronic attack payload within the lethal engagement envelope of an integrated air defence system (IADS). Jamming is employed to disrupt and degrade early warning, surveillance and weapon control radars so as to disrupt or confuse adversary radar coverage, and in doing so provide a screen of protection for crewed combat air platforms, or stand-off weapons, as they penetrate contested airspace.

Informed by operations in Ukraine, the fast-track introduction of StormShroud has come just one year after the Urgent Capability Requirement (UCR) was endorsed. Tekever and Leonardo have worked with the RAF's Rapid Capability Office (RCO), the Air and Space Warfare Centre, the Defence Science and Technology Laboratory (Dstl), and the Catalyst team in the UK's Defence Equipment and Support organisation to deliver the capability.

Tekever's rail-launched AR3 is a small, long-endurance UAS designed to support a range of land-based and maritime operations. The AR3 vehicle has been deployed in Ukraine since 2022, logging more than 10,000 operational flight hours to date.

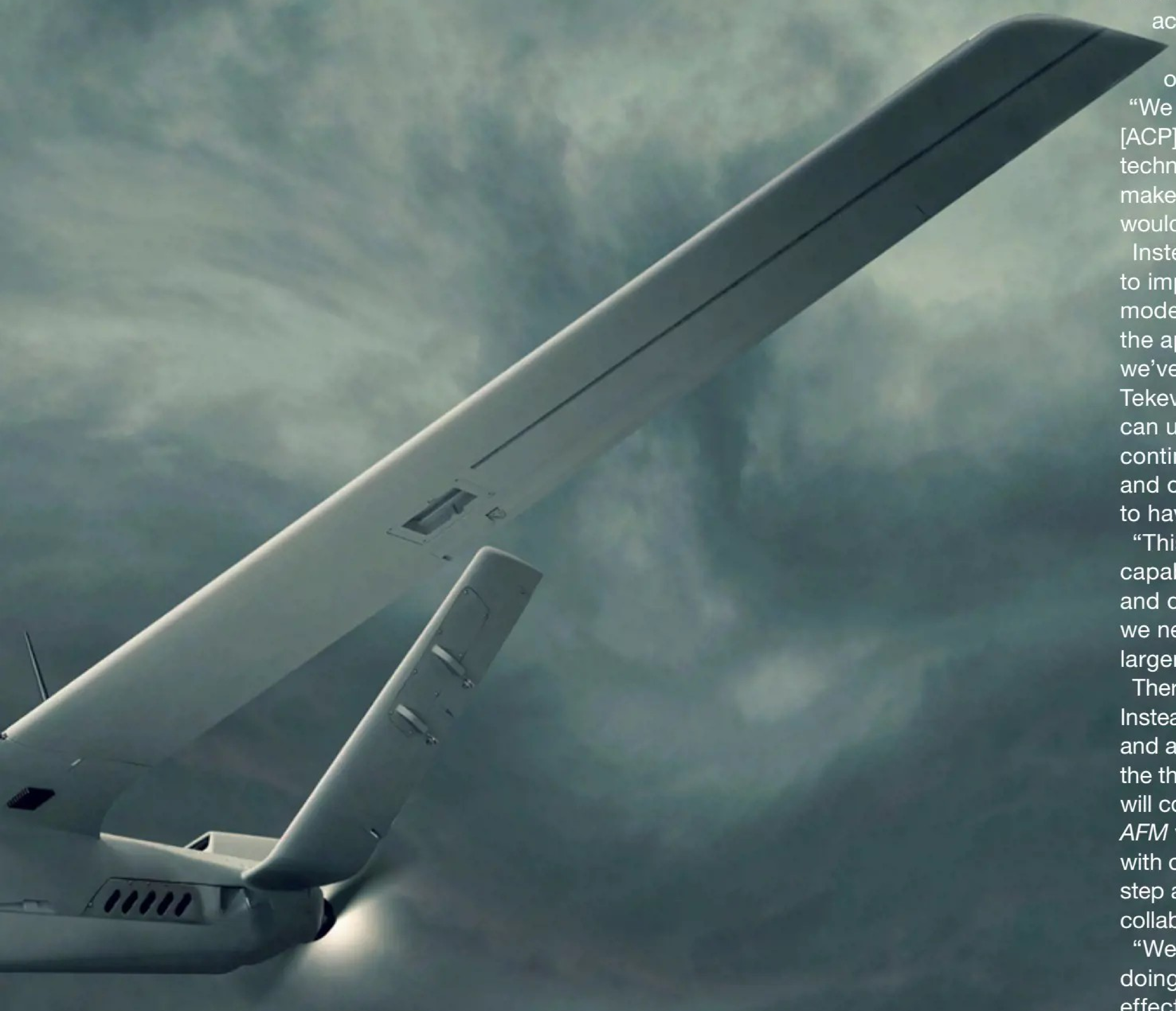
Ricardo Mendes, CEO of Tekever, said the AR3 vehicle routinely performs operations at ranges over 200km while maintaining connectivity via datalink. "And it can be launched and recovered at one site, but controlled from a different site," he added. "The autonomy and artificial intelligence on board is the basis for performing the entire operation."

The embedded autonomy means the AR3 can take 'decisions' during the course of a mission, and adapt to a changing environment. "That is an important part, because even if you are in datalink range you might need to be fully autonomous," said Mendes.

Building on miniaturised Digital Radio Frequency Memory (DRFM) technology proved in the BriteCloud expendable active decoy, and internal research and development activities going back a number of years, BriteStorm is a compact, platform-agnostic stand-in jammer payload combining a platform-specific antenna, transmit/receive modules and a miniature techniques generator. Use of DRFM technology enables a range of deception techniques to be generated.

Leonardo publicly debuted BriteStorm in October last year, and also revealed that the RAF – through the RCO – had purchased payloads and successfully performed both synthetic testing and live flight trials. "That gave us the confidence to move into low-rate initial production and build to stock," said Michael Lea, Leonardo UK's vice-president sales – electronic warfare.

"BriteStorm has been designed to be attritable," he added. "That means that we want it to come back for reprogramming and re-use, but its loss in combat can be



The StormShroud ACP integrates Leonardo UK's BriteStorm stand-in jammer payload with the Tekever AR3 tactical uncrewed air system
Leonardo

tolerated."

According to the RAF, StormShroud will be employed to screen Typhoon and F-35B Lightning aircraft operating within the IADS 'threat bubble'. The top-level concept of employment envisages ACPs ingressing the IADS envelope, delivering effects synchronised in time and space to support the force package, and then – if not lost during the mission – recovering to base.

The fact that the kinematics of the AR3 vehicle do not allow StormShroud to fly in with the fast jet package is overcome by co-ordination between the crewed and ACP force elements. "The geographical limitations of where different platforms have to work to achieve an effect does not constrain the platforms all having to fly, for example, at the same speed, or launch necessarily from the same point," said the RAF source.

"We would launch StormShroud to have an effect against radar that is either en route or at the point of effect for the combat air [component]. That would be planned and then executed collaboratively between squadrons."

Initial buy

An initial £19m investment has seen the RAF acquire a 24-strong fleet of StormShroud ACPs to meet the UCR. However, this is only a start, according to the RAF official: "We don't see this as a one-stop buy. The [ACP] Strategy is really clear on how fast the technology is evolving, and that it would not make sense to buy significant numbers that would become quickly obsolescent."

Instead, said the source, the RAF is looking to implement a much more agile acquisition model able to deliver relevant capability at the appropriate speed and scale: "What we've found in the development process with Tekever and Leonardo is something that we can use today, but something that we can continually develop. In order to overmatch and outpace any potential adversary we need to have industry available and ready to surge.

"This initial buy is about having an initial capability that we intend to develop over time, and demonstrate that we can do this and, if we need to, we could go quite quickly into a larger force if needed."

There is no defined final operating capability. Instead, the RAF plans to continue to iterate and adapt over time to stay ahead of changes in the threat. "There's a level of development that will continue, and an adversary will have a vote," *AFM* was told. "So we are continually working with our partners to see how we can stay one step ahead in both the autonomy and the collaborative [effect] that we're able to achieve.

"We don't want to gold-plate what we're doing. We want to get minimum viable effectiveness to the warfighter, and then to be able to evolve and adapt with the help of industry, Dstl and others."

The RAF sees StormShroud as the first of a planned family of ACPs: other use cases identified in the ACP Strategy include targeting and attack; communications relay; and intelligence, surveillance and reconnaissance.

"We will see a number of ACP effects from different platforms and with different

ROYAL AIR FORCE
TEKEVER

The RAF has invested £19m in an initial inventory of 24 StormShroud ACPs
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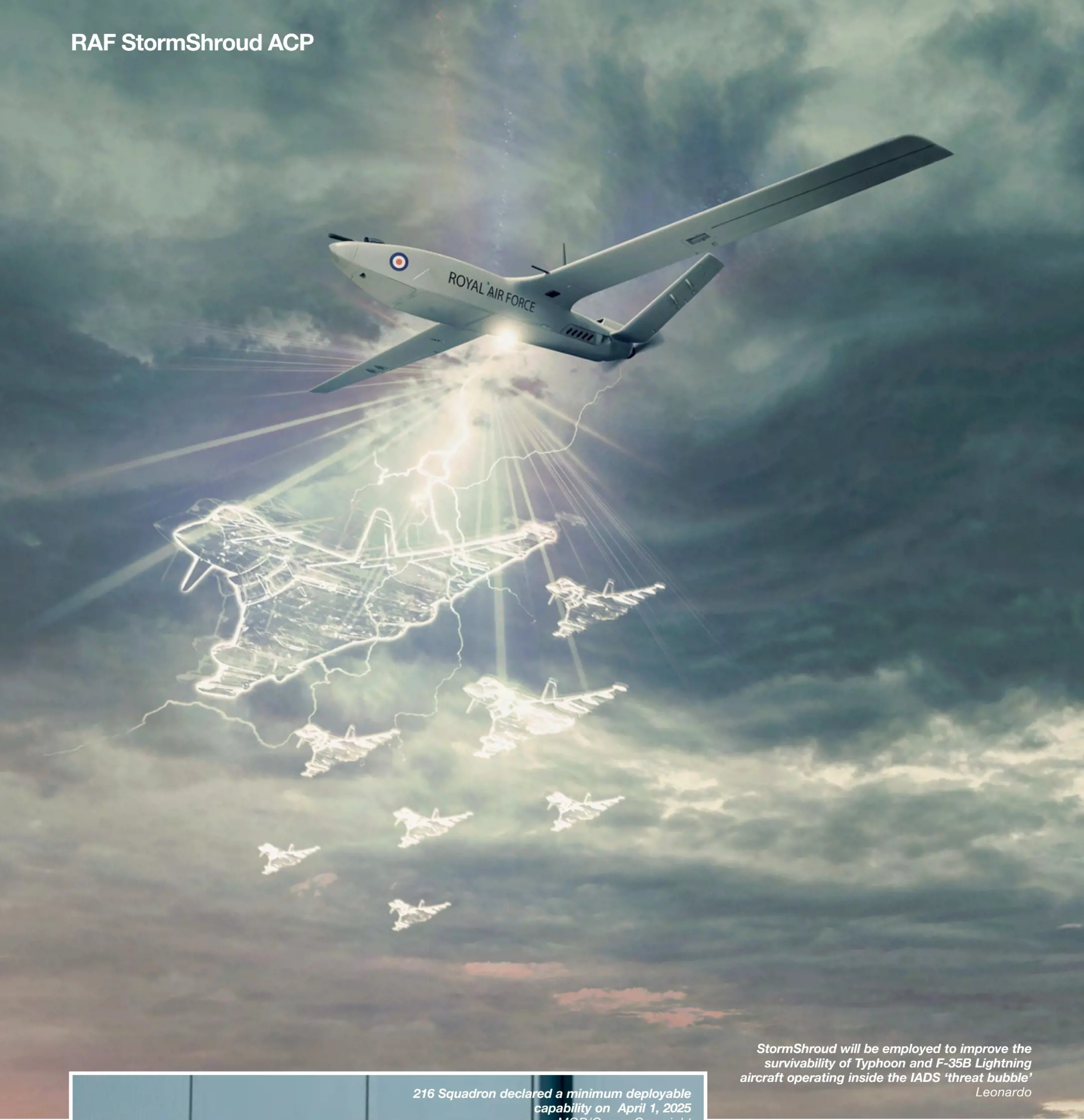

StormShroud will be employed to improve the survivability of Typhoon and F-35B Lightning aircraft operating inside the IADS 'threat bubble'
Leonardo

216 Squadron declared a minimum deployable capability on April 1, 2025
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payloads," the RAF source said. "They will range from very clearly 'disposable' up to things that cross the 'disposable/attritable' boundary. The concept of use may drive up the squadrons [we] require… we'll see where we get on that journey.

"At the moment we have 216 Squadron, and we're very happy with where they're going."

NATO studies, reaffirmed by lessons from the Ukraine conflict and backed up by technology demonstration trials, have pinpointed stand-in jammers as a key part of future SEAD operations. The expectation is that a variety of different platforms and payloads will be deployed across the alliance in a 'high/low' mix of survivable, attritable and expendable types. **afm**

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The Royal Air Force, Fleet Air Arm and Army Air Corps are among the world's most modern and capable air arms, boasting some of the most modern aircraft, helicopters, and weapons in service.

British Airpower Yearbook 2025 provides an overview of the nation's current inventory, as well as profiling the major commands and units that operate them.

The publication will also reflect on the major operations and exercises of 2024 involving British military aviation, missions in the Middle East defending Israel and air dropping humanitarian aid to Gaza, as well as supporting Ukraine and training with NATO allies.

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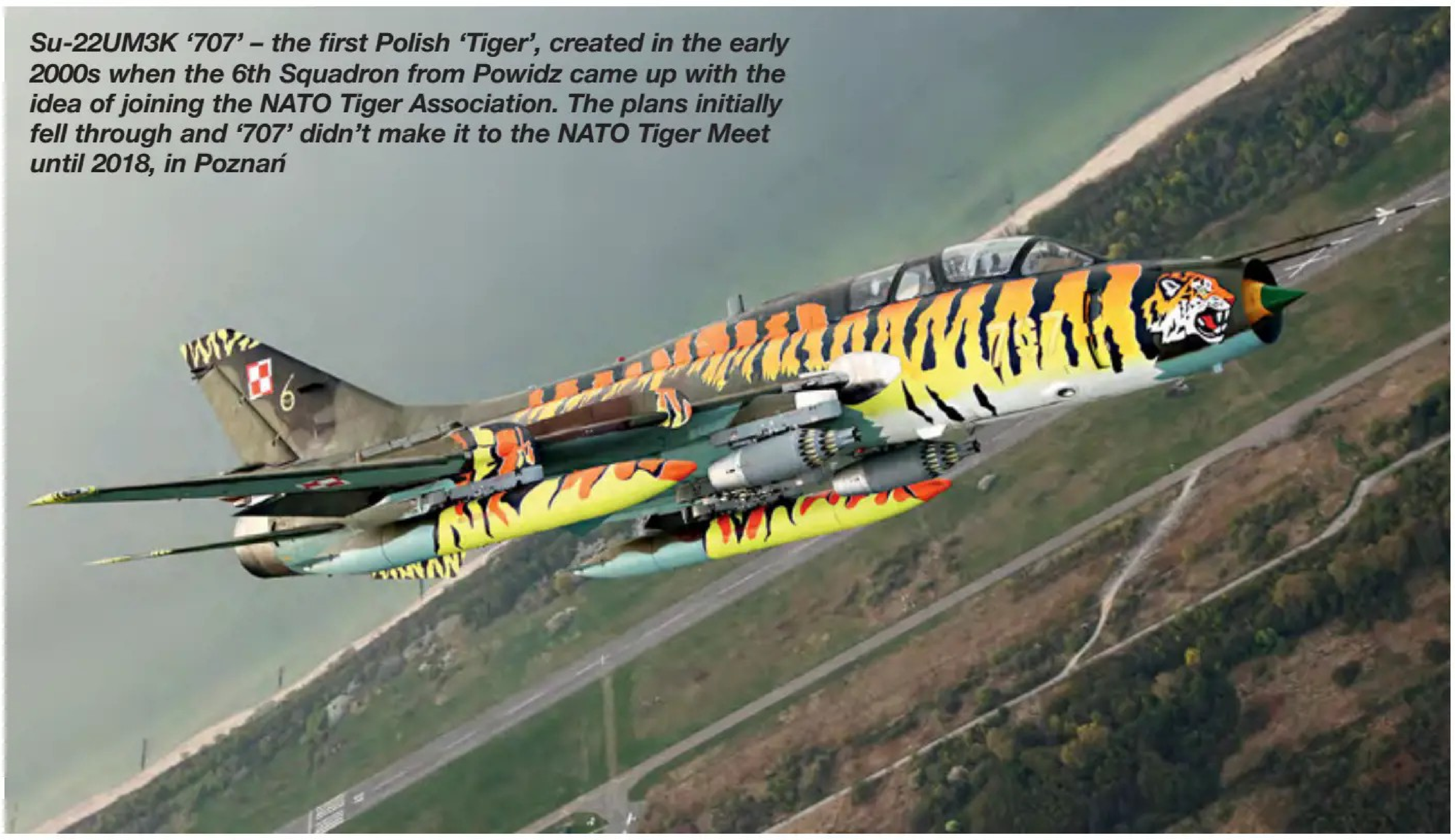
A formation of Su-22s over Kołobrzeg in Poland's military TSA12 zone, which has witnessed the daily operations of these aircraft for many years
All photos Bartosz Bera

Sun starts to set on Polish *Fitters*

Bartosz Bera flies with Polish Air Force Su-22 *Fitters*, the last remaining examples of the type in Europe as they head towards retirement in September



Su-22UM3K '707' – the first Polish 'Tiger', created in the early 2000s when the 6th Squadron from Powidz came up with the idea of joining the NATO Tiger Association. The plans initially fell through and '707' didn't make it to the NATO Tiger Meet until 2018, in Poznań

The final special livery of the Su-22UM3K of the Polish Air Force – a combination of the current 'grey' camouflage with the previous 'earth-toned' scheme, which, however, was not the first. Initially, the aircraft featured a slightly different greener paint scheme

For many years, Polish Su-22s did not undergo any meaningful modernisation. Their main drawback – the lack of a radar – was never addressed, despite numerous proposals. They were only upgraded with new communication systems and GPS receivers

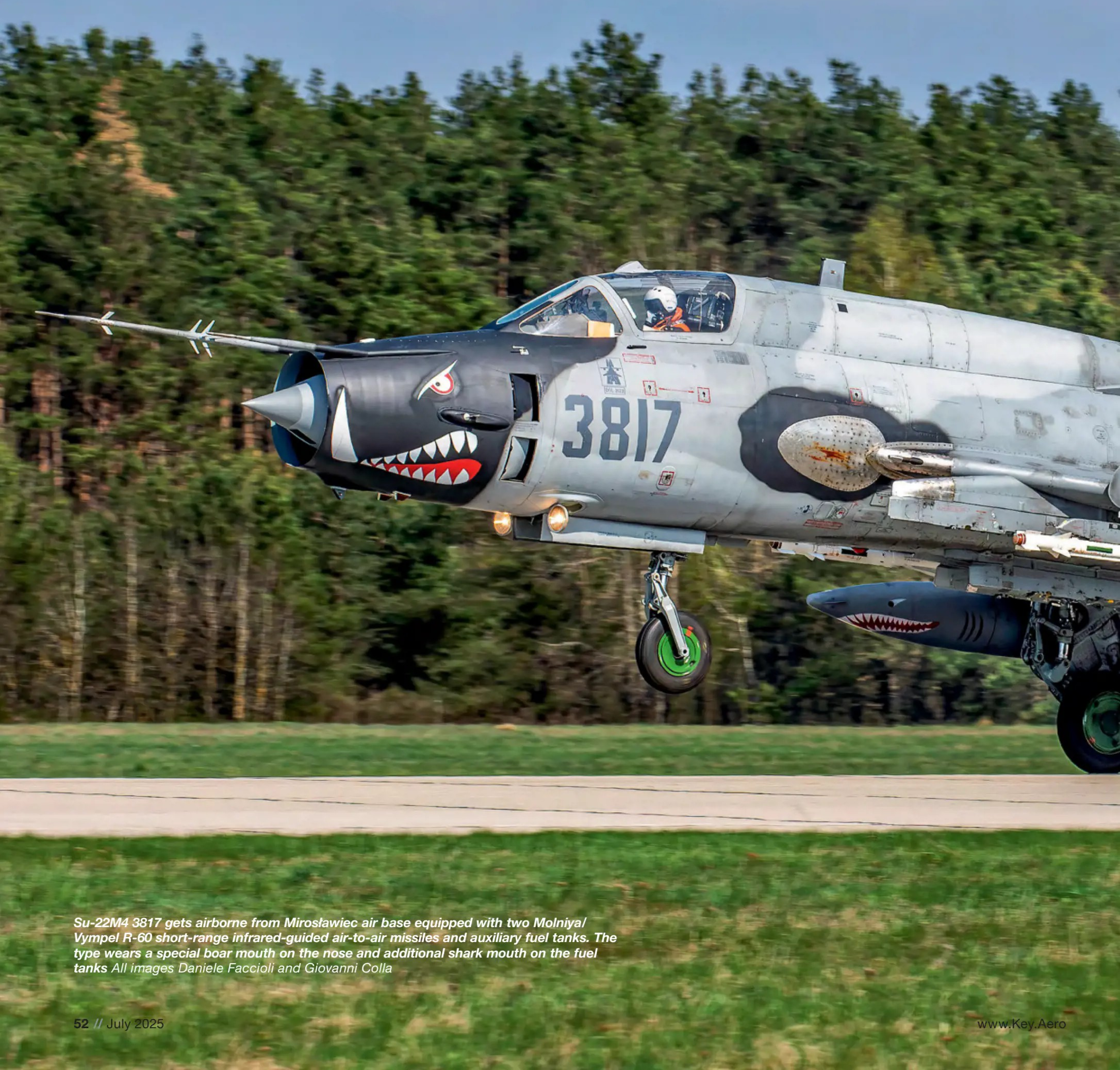
A total of 110 Polish Su-22s were stationed in four bases: Powidz, Piła, Świdwin, and Mirosławiec. Today, only three are active Polish Air Force bases – Piła now hosts only general aviation and is home to an interesting museum

UM3Ks in special liveries. The famous 'Black Boar' was still in service until recently when it was retired after reaching the end of its service life

It's remarakble how small the cockpit window is for such a big fighter

FINAL CHAPTER FOR FITTER

Once a backbone of Warsaw Pact air power, the Sukhoi Su-22 has become a symbol of resilience within the Polish Air Force. Daniele Faccioli and Giovanni Colla visited Mirosławiec Air Base to witness the aircraft's final operational activities in the months leading up to its official retirement from service.



Su-22M4 3817 gets airborne from Mirosławiec air base equipped with two Molniya/ Vympel R-60 short-range infrared-guided air-to-air missiles and auxiliary fuel tanks. The type wears a special boar mouth on the nose and additional shark mouth on the fuel tanks *All images Daniele Faccioli and Giovanni Colla*

SIŁY POWIETRZNE

21. BAZA LOTNICTWA TAKTYCZNEGO im. mjr pil. Stefana STECA
05.09.2019
Świdwin

ŚWIDWIN
POLISH AIR FORCE
SU-22 „FITTER"

ŚWIDWIN
POLISH AIR FORCE
SU-22 „FITTER"

Su-22M4 3817 taxiing back to its spot after a training mission at Ustka training range

A close-up shot of a 'Fitter' driver

The Sukhoi Su-22 Fitter remains the longest-serving combat aircraft currently in operational use by the Polish Air Force (Siły Powietrzne). The first unit, a Su-22M4 with serial number 3005, landed at Piła Air Base on August 28, 1984. Over subsequent years, Poland acquired a total of 90 Su-22M4s and 20 two-seater Su-22UM3Ks, deployed across four tactical bomber regiments stationed at Piła, Powidz, Mirosławiec and Swidwin.

The induction of the initial batch of 13 Su-22M4s and six Su-22UM3Ks necessitated extensive airbase infrastructure upgrades and specialised training for maintenance crews, given the aircraft's increased complexity compared with earlier-generation platforms.

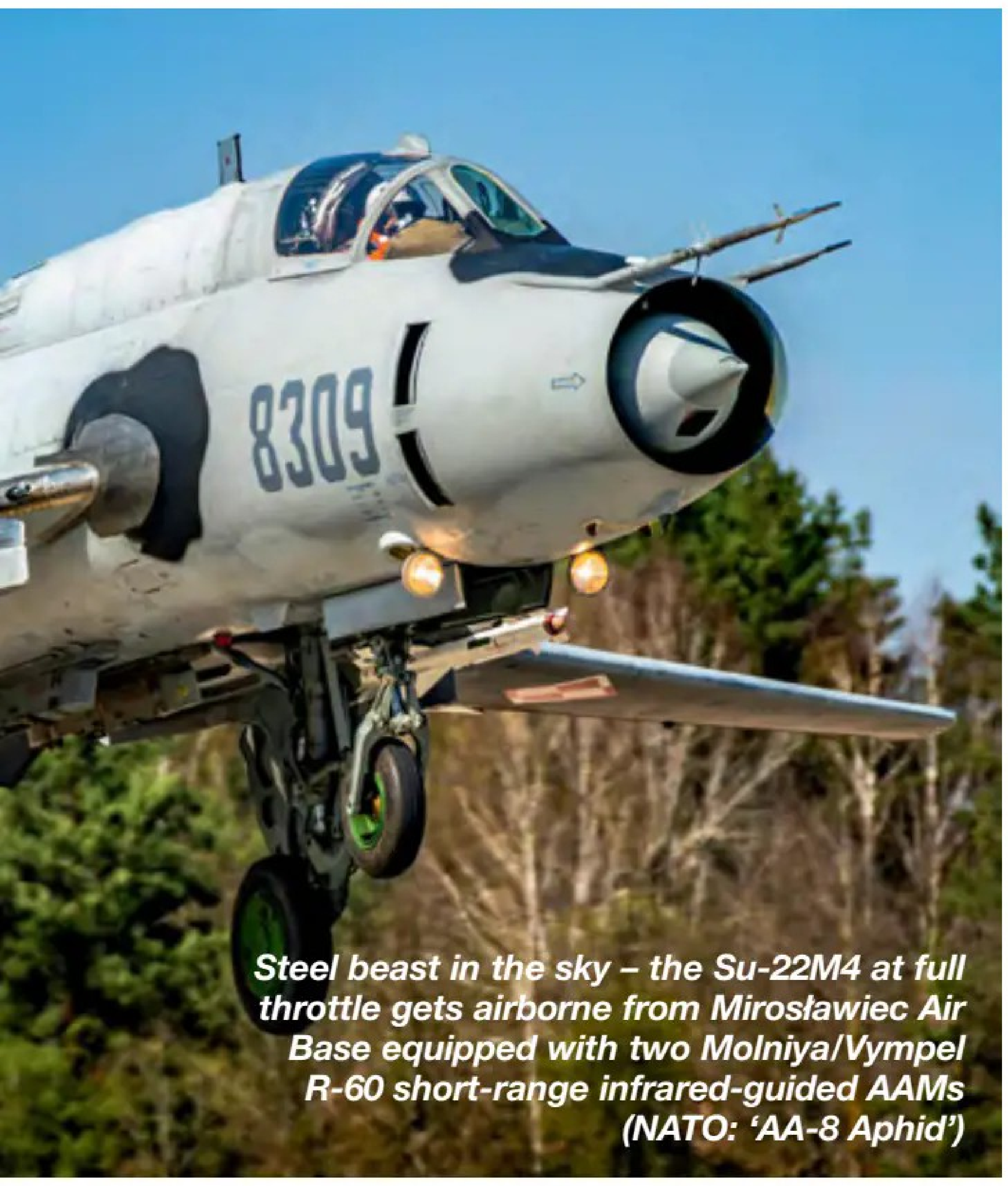
Following Poland's accession to NATO in 1999, despite various military modernisation efforts and recurring plans to retire Soviet-origin assets, the country continued operating the Su-22, much like its approach with the MiG-29, subjecting the fleet to incremental upgrades to maintain operational readiness. The Su-22 fleet underwent a series of critical modifications to ensure interoperability with alliance forces. These upgrades included integrating NATO-standard identification friend or foe (IFF) systems, radio transponders and anti-collision lighting systems.

As other European operators – such as Russia, former Czechoslovakia, Hungary, Bulgaria and East Germany – retired the Su-22, maintaining Poland's fleet became increasingly resource-intensive, with all sustainment and MRO (maintenance, repair and overhaul) activities falling solely on domestic personnel.

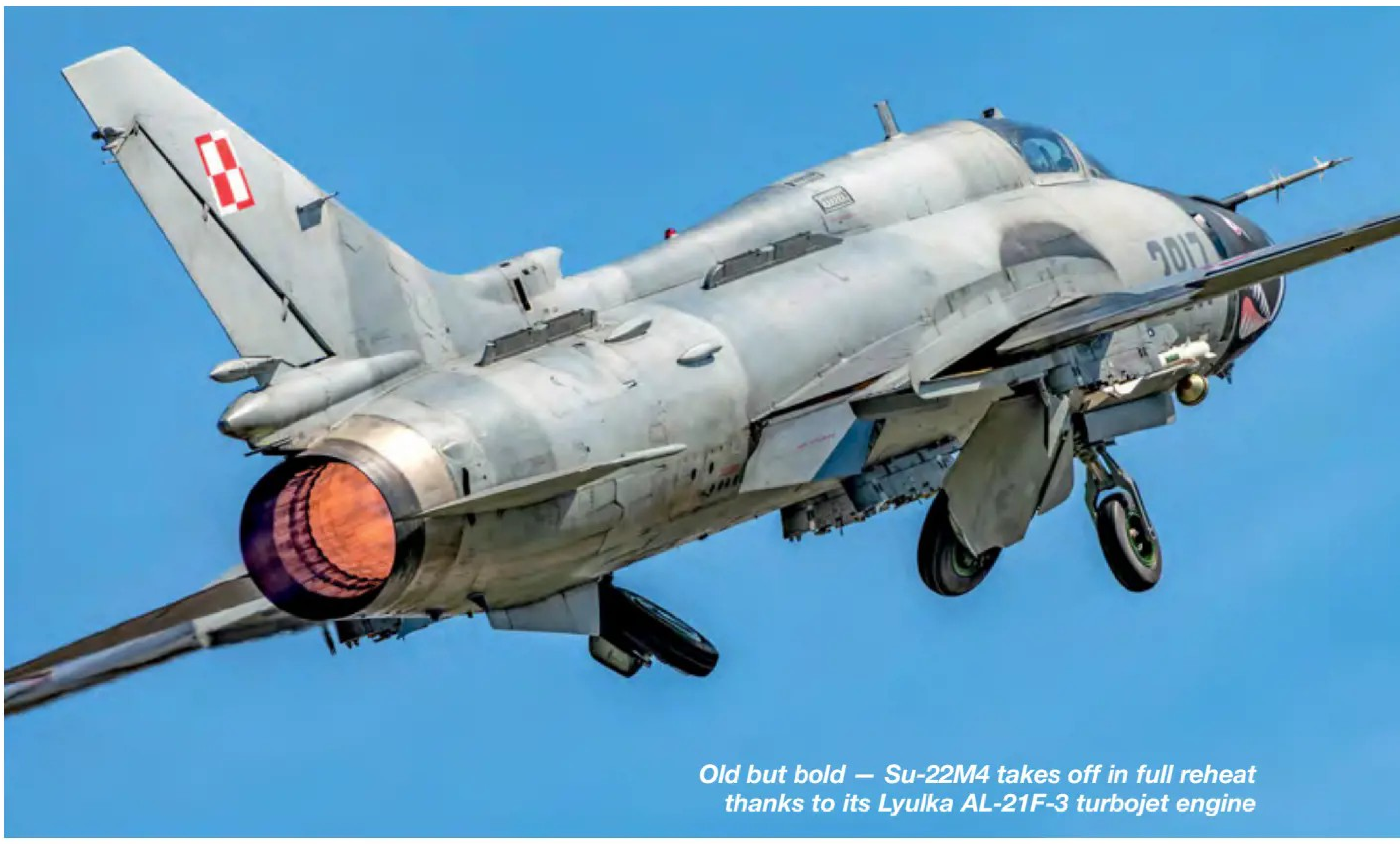
Despite the entry into service of F-16C/D Block 50/52 aircraft and a previously announced Su-22 retirement date in 2016, a lack of viable replacements prompted the Polish Ministry of Defence to extend the fleet's service life. Under this revised plan, 18 aircraft were selected for a limited upgrade, extending their operational use until at least 2024, nearly 40 years after initial delivery.

Su-22 flightline at Mirosławiec Air Base

Face to face with the Su-22M4 8309, taxiing back equipped with two R-60 AAMs



Steel beast in the sky – the Su-22M4 at full throttle gets airborne from Mirosławiec Air Base equipped with two Molniya/Vympel R-60 short-range infrared-guided AAMs (NATO: 'AA-8 Aphid')



Old but bold — Su-22M4 takes off in full reheat thanks to its Lyulka AL-21F-3 turbojet engine

The Su-22 gets an upgrade

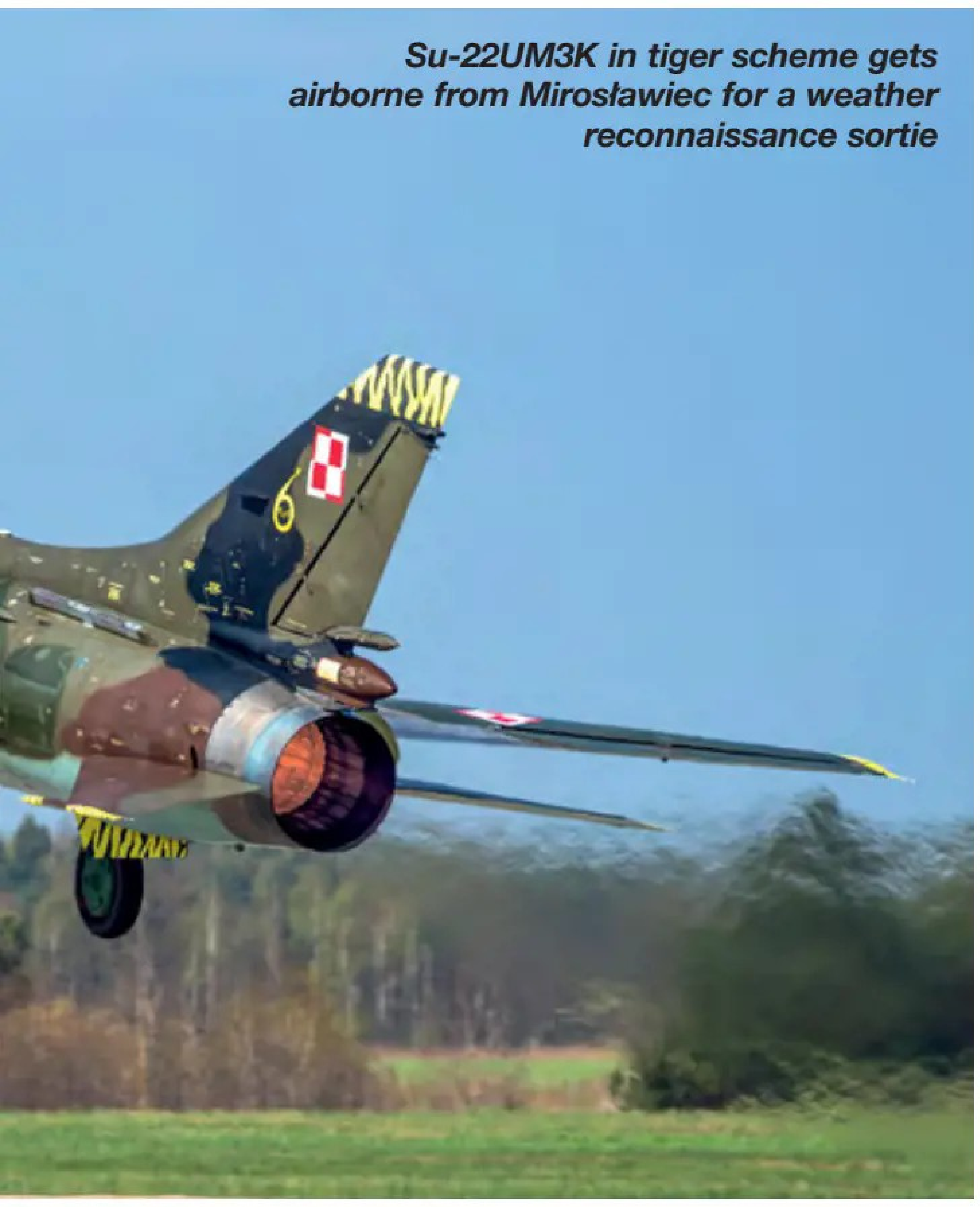
The Polish Air Force initiated a final modernisation programme, which involved the installation of new avionics, an upgraded gun camera and modern VHF/UHF communication systems. A contract signed on February 9, 2015, tasked Wojskowe Zakłady Lotnicze Nr 2 (WZL-2) in Bydgoszcz – the facility responsible for Su-22 lifecycle support since their introduction – with performing the upgrade work.

The package included a new RS-6113 radio, a digital flight data recorder and the replacement of metric cockpit instruments with imperial-standard equivalents. The airframe life of each aircraft was extended by ten years. The modernised aircraft received a new low-visibility two-tone grey camouflage, replacing the legacy green-brown disruptive pattern. Two Su-22UM3Ks – serials 707 and 305 – retained their special liveries: the former featuring a tiger-striped scheme for NATO's Tiger Meet, and the latter in a matte black finish. Only the tiger-liveried aircraft remains airworthy.

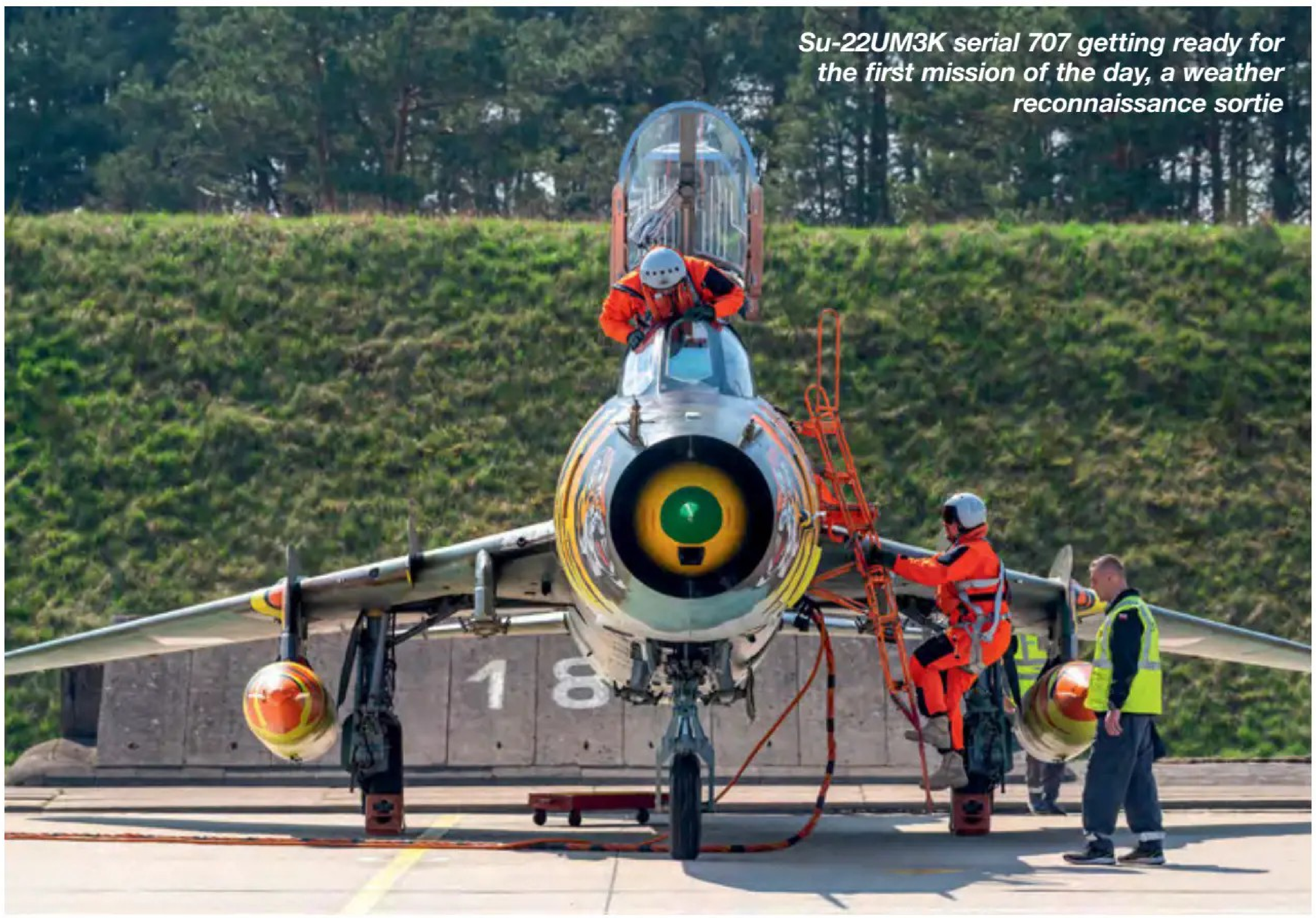
From a maintenance perspective, the Su-22M4 proved easier to sustain than older Soviet designs like the MiG-21 or MiG-23, despite its enhanced systems. This is due to its modular design, use of line replaceable units (LRUs) and built-in test equipment for diagnostic features that simplify maintenance tasks and allow operation from semi-prepared runways with minimal logistical support.

Technically, the Su-22 stands out with its variable-sweep wing configuration, an advanced aerodynamic solution for its time – unlike the Panavia Tornado, where the entire wing pivots, the Su-22's outer wing panels sweep. At the same time, the inner fixed sections (housing hard points for underwing stores) remain static. This design avoids the structural complexities of synchronising store alignment during wing movement.

Nevertheless, the Su-22 is a product of an older design era, with a higher pilot workload than contemporary fighters. Its wing-sweep mechanism incorporates leading-edge and trailing-edge flap controls, requiring



Su-22UM3K in tiger scheme gets airborne from Mirosławiec for a weather reconnaissance sortie



Su-22UM3K serial 707 getting ready for the first mission of the day, a weather reconnaissance sortie

Su-22M4 8309 taxiing back equipped with two R-60 AAMs. Due to the imminent retirement, the Polish Air Force is actively working to transfer institutional knowledge from the last Su-22 pilots to future units of KAI FA-50 and F-35

Su-22UM3K serial 707 takes off for a weather reconnaissance sortie

significant pilot attention during critical flight phases, such as take-off and landing.

The airframe features eight to ten external hardpoints, enabling a maximum ordnance payload of approximately 4,000kg. The standard weapons suite includes unguided munitions, rocket pods, gun pods and general-purpose bombs. While optimised for ground-attack missions, the aircraft can also carry Molniya/Vympel R-60 short-range infrared-guided AAMs (NATO: *AA-8 Aphid*) for self-defence. However, Su-22 combat doctrine emphasises high-speed strike missions with immediate egress, leaving air-to-air engagement to escort fighters.

Moving into retirement

The mid-April training exercise we witnessed focused on R-60 missile launches at the Ustka weapons range in northwest Poland, near Słupsk and 140km from Mirosławiec Air Base. Each day started with a weather reconnaissance sortie by an Su-22UM3K. Once conditions were validated, an Su-22M4 configured with four CP-100M-R/IR aerial targets and dual external fuel tanks took off, followed by three Su-22M4s in air-to-air loadout, each armed with two R-60 missiles and auxiliary fuel tanks.

Polish pilots describe the Su-22 *Fitter* as a reliable and rugged platform, featuring durable but straightforward Soviet-style avionics.

"The Su-22 was a capable aircraft in its role," said pilot Major General Ireneusz Starzyn´ski, commander of the air operations centre overseeing Polish airspace. "It's outdated today and cannot be compared to the F-35. Still, it was a well-rounded machine in its time. It's nearing retirement and is mainly used as a Red Air aggressor for training air force squadrons and ground-based air defence (GBAD) units. We also continue limited air-to-air training, such as missile employment drills."

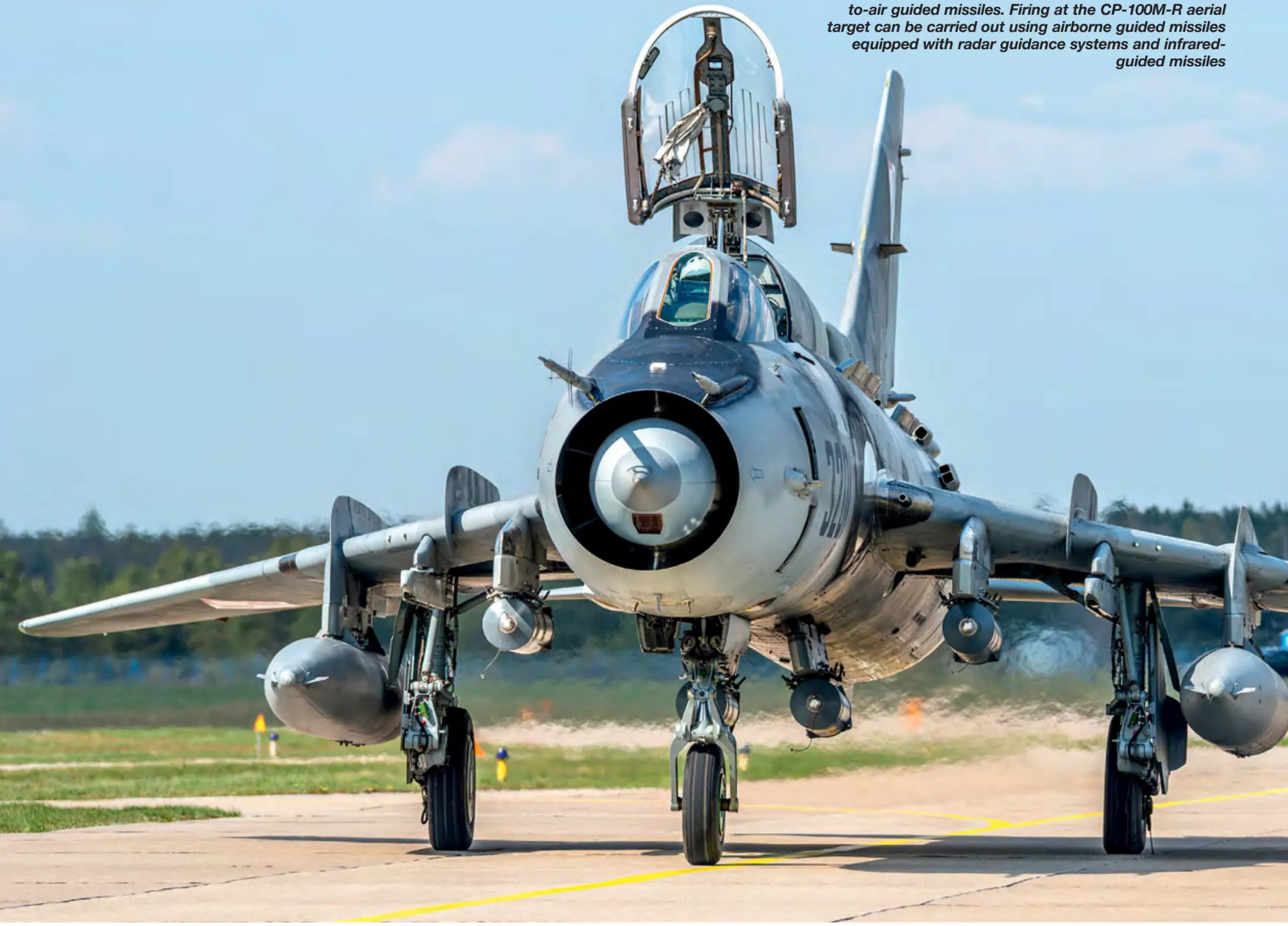
Though outdated, the aircraft's navigation and targeting systems remain reliable even under austere conditions. Though obsolete, its Lyulka AL-21F-3 turbojet engine is known for reliability and resilience to foreign object damage (FOD).

"These are probably my last flights – maybe not the final ones, since the Su-22 will stay in service until September or October – but certainly the end is expected before the end of the year," added Gen Starzyński, who previously commanded Świdwin Air Base. Over 32 years of service, he logged 2,500 flight hours, more than 2,000 on the Su-22.

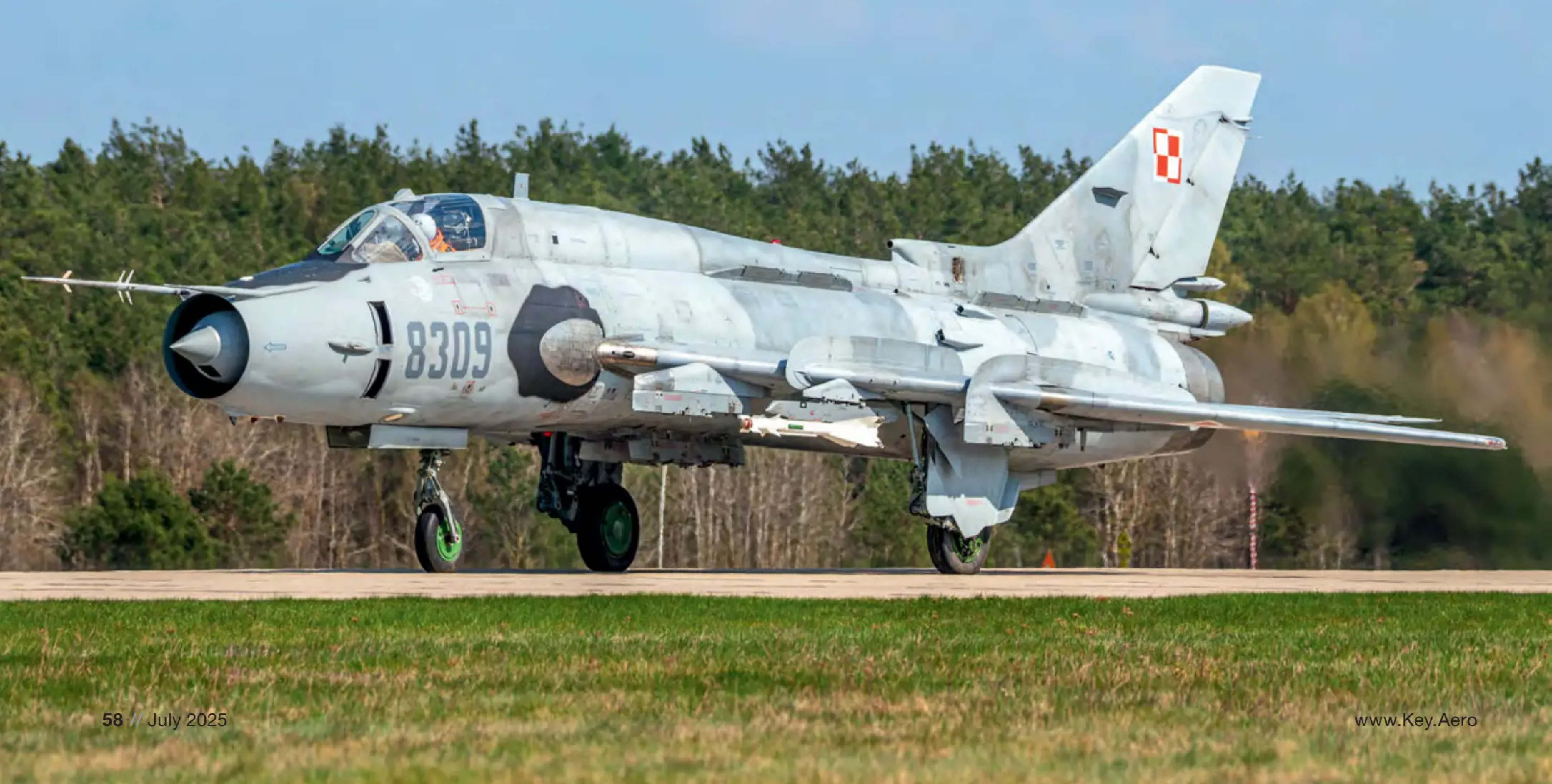
On the right, pilot Maj Gen Ireneusz Starzyński, commander of the air operations centre overseeing Polish airspace. He has more than 2000 flight hours on the Su-22

Su-22M4 8101 with boar mouth, receiving maintenance under a tent

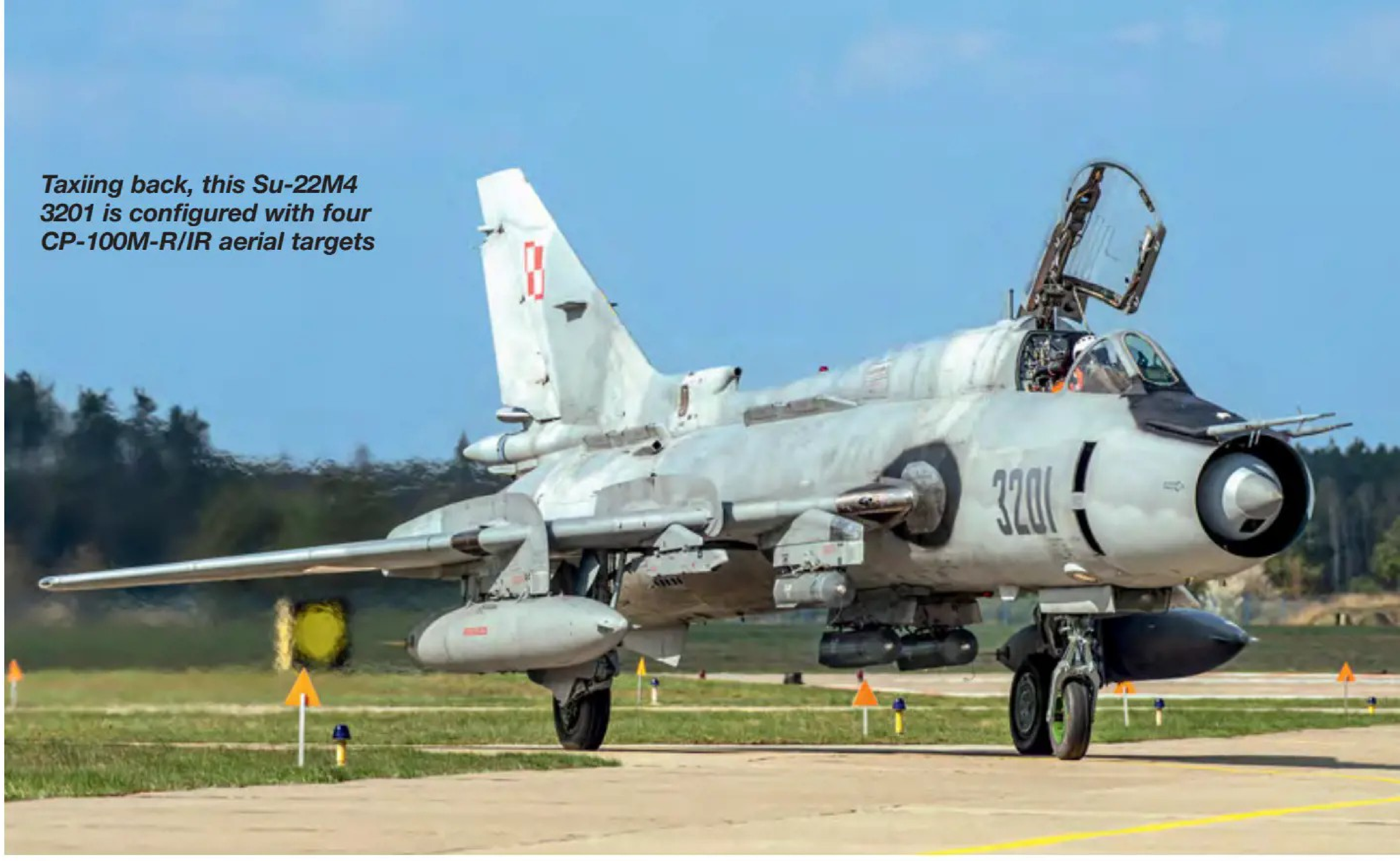
To mark a significant milestone, the Polish Air Force applied a commemorative paint scheme for one of its most iconic aircraft – the two-seat Sukhoi Su-22UM3K (tail number 509). This special edition jet features a unique livery that blends vintage camouflage on the forward fuselage with a sleek two-tone grey on the rear. A bold '40' adorns the tailfin, painted in the red and white of the Polish flag. The design honours four decades of Su-22 operations and stands as a vivid tribute to a transformative chapter in Poland's military aviation history



Su-22M4 3201 is configured with four CP-100M-R/IR aerial targets that are designed to train pilots in launching air-to-air guided missiles. Firing at the CP-100M-R aerial target can be carried out using airborne guided missiles equipped with radar guidance systems and infrared-guided missiles



Su-22M4 8309 on the runway at Mirosławiec. Originally based at Swidwin Air Base, where sweeping modernisation efforts are under way to welcome the new Lockheed Martin F-35A Lighting II jets, all the 'Fitters' have been relocated to Miroslawiec Air Base

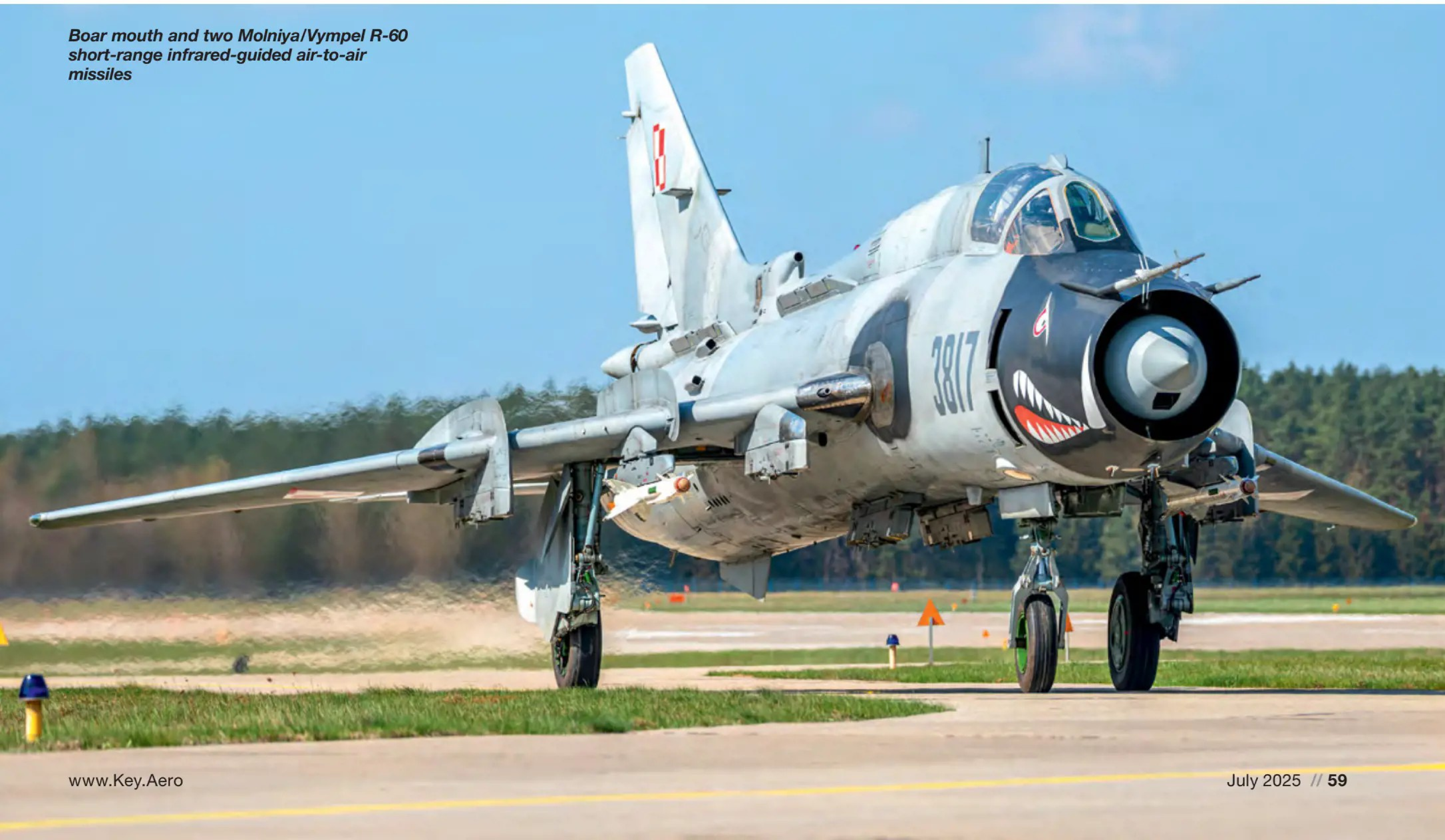

Taxiing back, this Su-22M4 3201 is configured with four CP-100M-R/IR aerial targets

“Despite flying it most of my career, the strongest memory remains the first flight. After take-off, I was convinced landing would be impossible,” he joked, recalling the stark speed difference from the Iskra and MiG-15UTI (Lim-2) trainers he had flown before.

With its retirement imminent, the Polish Air Force is actively working to transfer institutional knowledge from the last Su-22 pilots to future units. Świdwin’s 21st Tactical Air Base (21. Baza Lotnictwa Taktycznego, 21.BLT) – Europe’s central Su-22 hub – will soon host a squadron of F-35s and two of KAI FA-50 light combat aircraft. While all squadrons will be multi-role, one FA-50 unit will focus on air-to-ground missions, drawing from the Su-22 legacy. There will be no direct successor for tactical reconnaissance, which will instead be assumed by unmanned aerial systems (UAS).

The imminent deployment of the new F-35 and FA-50 aircraft to Świdwin Air Base has necessitated extensive infrastructure modernisation efforts. These works include comprehensive upgrades to the runway, taxiways, multiple logistical facilities and the air traffic control tower. The full scope of the renovation is expected to be completed within two years.

As a result, it became necessary to relocate the remaining operational Su-22 airframes to Mirosławiec Air Base. Although currently designated for the Polish Armed Forces’ tactical drone operations, specifically the Bayraktar TB2 unmanned aerial systems, Mirosławiec still retains its legacy infrastructure, such as hardened aircraft shelters and apron space, originally built to accommodate manned combat aircraft units. These facilities remain suitable for hosting forward-deployed squadrons and temporarily assigned air assets. This symbolic return to Mirosławiec, where Su-22 units had once been stationed during the height of their operational deployment, has likely conferred on the installation the distinction of serving as the final European garrison of the legendary Soviet-era fighter-bomber platform. **afm**


Boar mouth and two Molniya/Vympel R-60 short-range infrared-guided air-to-air missiles

Ready to Strike

The French Air and Space Force (FASF) has officially declared its fleet of Mirage 2000D RMV (Rénovation à Mi-Vie – mid-life upgrade) strike fighters fully operational. Henri-Pierre Grolleau reports

The Mirage 2000D RMV upgrade was officially launched in 2016 by French defence procurement agency the DGA, and was qualified in 2022. Deliveries started in 2022 and are expected to be completed by the end of 2025. Initial operational capability was declared in 2023, and full operational capability on April 9, 2025, at Base Aérienne 133 Nancy-Ochey. In all, it took nearly a decade to complete this comprehensive programme.

As a reminder, the RMV upgrade encompasses a large number of systems and weapons:

- A reworked navigator cockpit with much larger displays to provide the weapon system operator with a better understanding of the evolving tactical situation
- A CC422 gun pod for a Defa 553 cannon and 250 shells (30 x 113 Defa), that 30mm cannon being the former Mirage F1 gun drawn from stocks and refurbished for the CC422 pod
- Capability to drop GBU-48 and GBU-50 Enhanced Paveway laser and GPS-guided bombs, thus supplementing the earlier GBU-12/16/22/24 Paveway II/III and GBU-49 Enhanced Paveway bombs already in service and offering Mirage 2000D aircrews a wider range of options and effects to attack targets in all weathers, even through cloud cover
- Capability to mix weapons (Paveway and sleek unguided Mk 82 bombs, for example), something that was not previously feasible on the Mirage 2000D
- Replacement of the outdated Magic 2 infrared-guided self-defence missile by the newer and incomparably more capable Mica IR
- Upgrade of the L16 datalink terminal to the latest Block Upgrade 2 (BU2) standard.

EC 2/3 CHAMPAGNE
EC 1/3 NAVARRE
LOW LEVEL
GOOD VIBRATIONS

The Mirage 2000D RMV will remain in service at least until 2035. No plans have been announced yet for its replacement
All images Henri-Pierre Grolleau

The Mirage 2000D RMV was officially accepted into service during a ceremony on April 9, 2025

Contrary to what has been published by other media, the Mirage 2000D is not equipped with the Scorpion helmet-mounted display, this system so far being restricted to the Rafale B/C/M fleet. However, the Mirage 2000D RMV will soon be fitted with the Talios targeting pod that will progressively supplant current pods.

The number of aircraft to be upgraded has been limited to 50, down from the 55 initially envisioned, leaving ten airframes to be reduced to spares to support the existing fleet until its sundown, expected in 2035.

A range of missions

The Mirage 2000D RMV is tailored to conduct a wide range of air-to-surface and intelligence gathering missions. “The Mirage 2000D RMV remains at the forefront of the FASF combat capabilities thanks to its high-speed low-level penetration capability using the fighter’s automatic terrain following system,” explained Général Vincent Chusseau, head of the FASF Plans and Programmes office, during a speech at Nancy. He continued: “The Mirage 2000D RMV undertakes various types of missions – close air support in a permissive or semi-permissive environment, precision attacks with laser-guided or GPS-guided bombs, precision strikes from stand-off distances with the Scalp cruise missile, and electronic intelligence with the Astac ELINT pod.

“Thanks to the RMV upgrade, the Mirage 2000D stays in the top league alongside the Rafale, and the inherent evolutivity of its new weapon system will allow us to easily introduce new functionalities, new systems and new weapons in the future.”

The conversion from the Mirage 2000D to the 2000D RMV was quick, with Escadron de Chasse 2/3 ‘Champagne’, the Mirage 2000 schoolhouse at Nancy-Ochey, being the first to convert. Captain Camille (full name withheld), an experienced EC 3/3 ‘Ardennes’ weapons systems officer (WSO), said: “Initially, when the number of upgraded aircraft was limited, aircrews flew both variants. New aircrews coming from the training pipeline started flying exclusively the RMV variant from mid-2024, and from then on, things progressed rapidly as a growing number of newcomers, seasoned pilots and WSOs converted to the new variant. Today, all but one of our aircraft have been upgraded, and only experienced aircrews are cleared to fly the original, un-modernised aircraft. However, from the summer of 2025 we will only operate RMV aircraft, bringing to an end the upgrade effort for our squadron.”

Training for high-intensity warfare

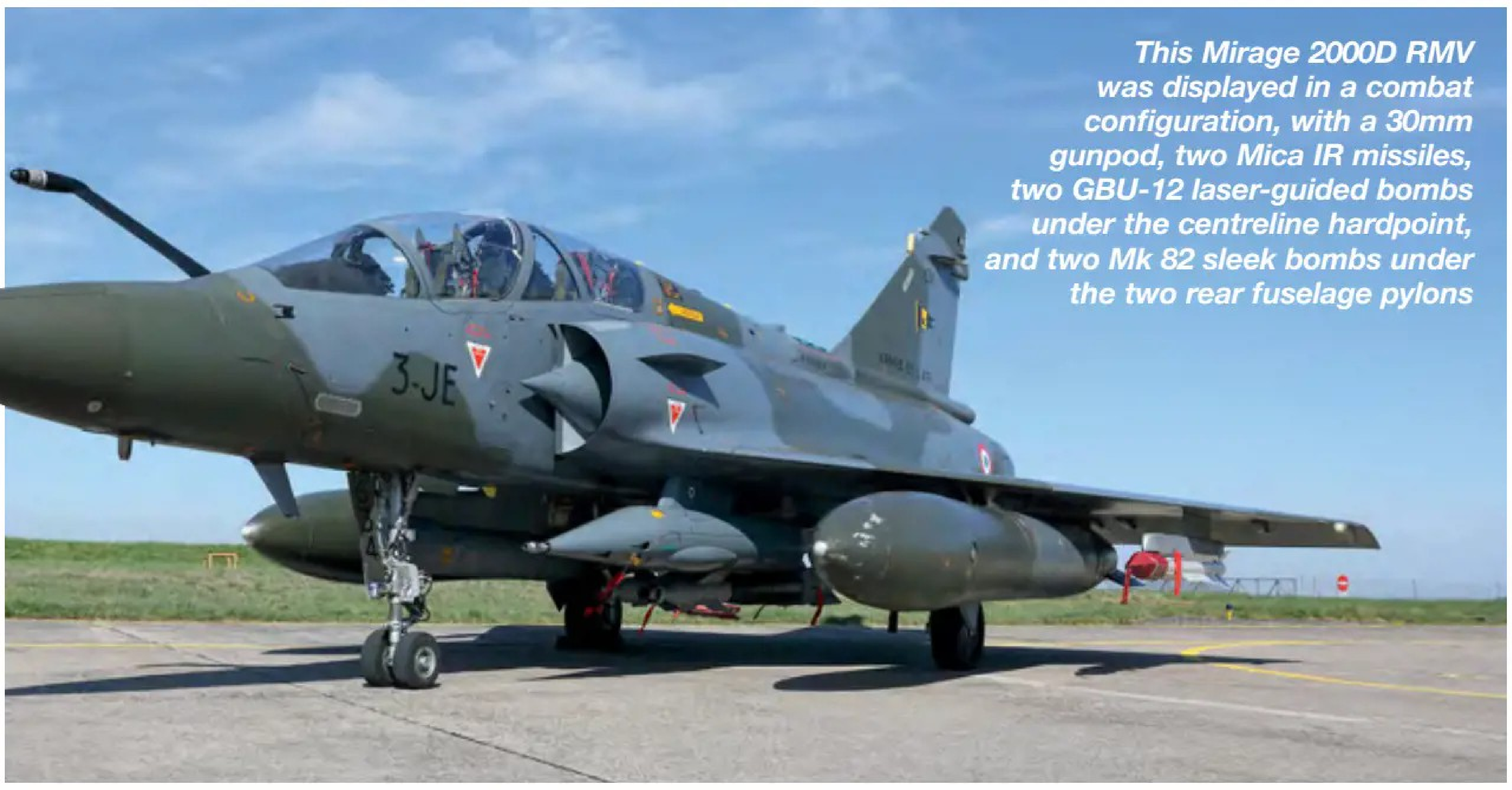
Since the French military was forced to withdraw from Mali, Niger, Burkina Faso and Chad, the Mirage 2000D has not had a frontline mission in Africa. But this is considered an opportunity in Nancy, allowing 3ème Escadre de Chasse aircrews to reduce the amount of training devoted to close air support (CAS) and to concentrate on higher-end high-intensity warfare scenarios in central Europe. One aircrew insisted that the Mirage 2000D community had refocused from rather monotonous and repetitive missions, spending long hours providing top cover to French forces in the desert in case something might happen (and sometimes something did…, to more interesting combat roles, flying combined

A four-ship formation overflew the Mirage 2000D RMV entry into service ceremony

air operations with other strike fighters against red air opposing forces in often challenging exercises.

What can be taken for granted is that 3ème Escadre de Chasse aircrews will do whatever they can to take advantage of the enormous tactical capabilities of their mount. Lieutenant Colonel Mickaël (full name withheld), EC 2/3 deputy commander, said: "We had never stopped training for high-end warfare, and all our crews were still capable of undertaking low-level penetrations using the Antilope terrain-following radar, but we are now devoting more time and effort to that aspect of our mission, and less time to CAS.

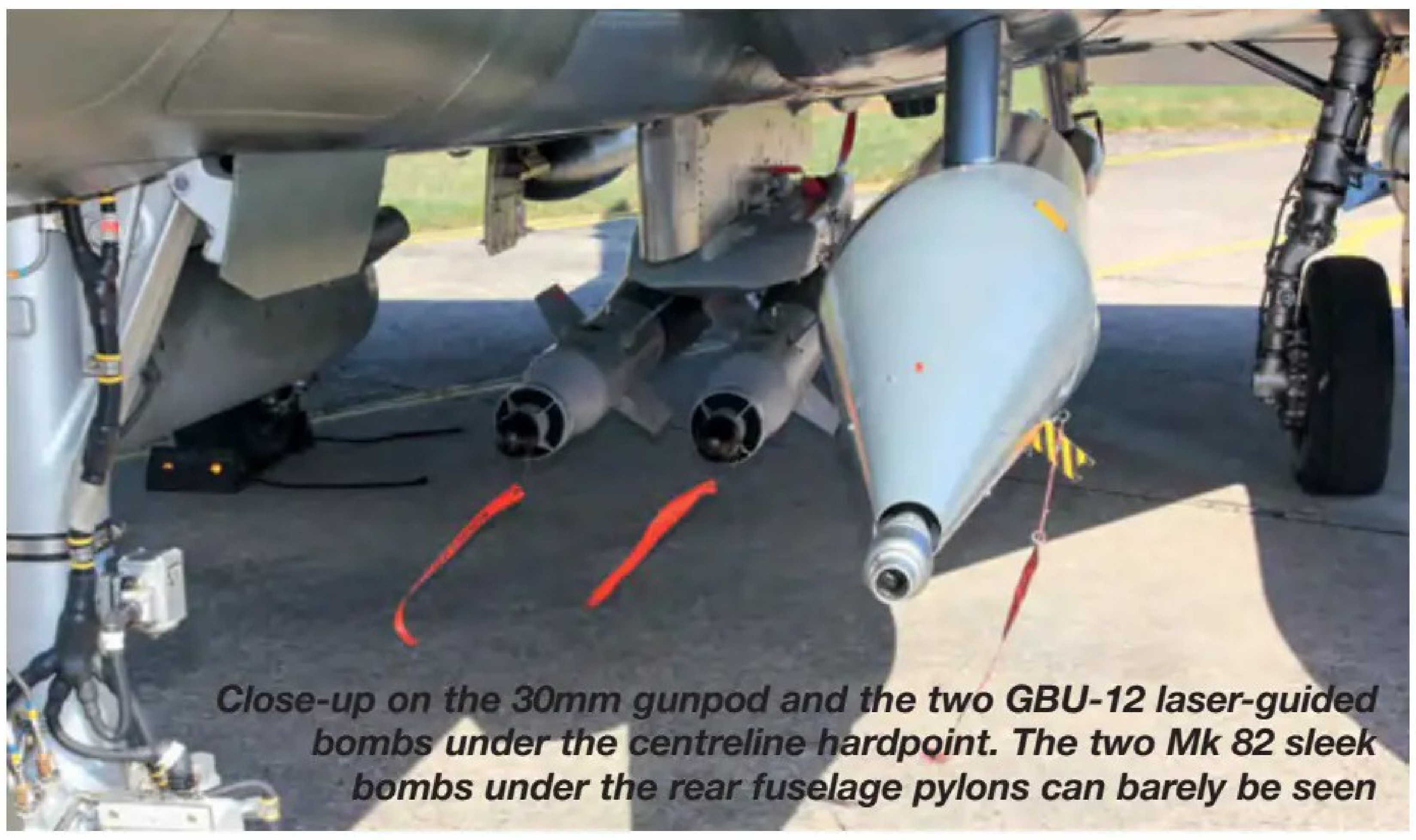
"All aircrews are trained to fly all missions right from the beginning, including the ELINT

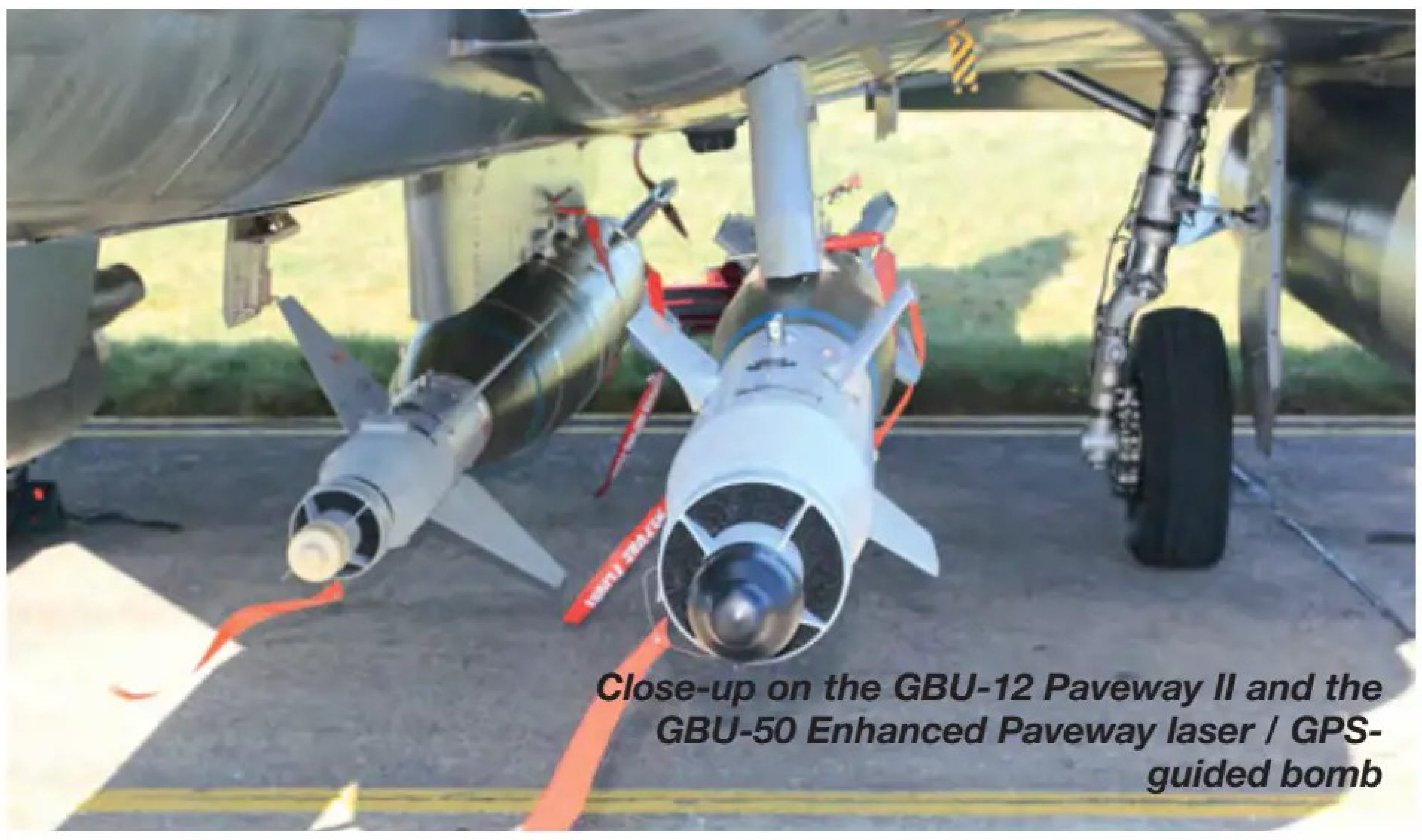


This Mirage 2000D RMV was displayed in a combat configuration, with a 30mm gunpod, two Mica IR missiles, two GBU-12 laser-guided bombs under the centreline hardpoint, and two Mk 82 sleek bombs under the two rear fuselage pylons

Général Vincent Chusseau, head of the FASF Plans and Programmes office, officially cuts the ribbon to mark the Mirage 2000D RMV's entry into service symbolically

Sporting the markings of Escadrille Spa 62 'Coq de Combat', this EC 1/3 'Navarre' taxies out at Nancy. It is armed with a 30mm gunpod.


Close-up on the 30mm gunpod and the two GBU-12 laser-guided bombs under the centreline hardpoint. The two Mk 82 sleek bombs under the rear fuselage pylons can barely be seen


Close-up on the GBU-12 Paveway II and the GBU-50 Enhanced Paveway laser / GPS-guided bomb

mission with the Astac pod. About 12% of our flight allocation is devoted to nighttime training with night-vision goggles. We also routinely fly at night at very low level and very high speed, exploiting to the full the aircraft's impressive all-weather terrain following capabilities."

Enhanced capabilities

Nancy aircrews greatly appreciate the RMV standard, Lt Col Mickaël said: "The RMV is a real game-changer, allowing us to seamlessly operate with other French and NATO aircraft thanks to our L16 BU2 datalink. The new mission planning/mission debriefing system is also major progress. We spend less time preparing the mission, meaning we can devote more duration in the planning phase to the tactics we will use to be more efficient and lethal, and to the 'what ifs' to be better prepared and more survivable should the mission not go as planned. The debriefing quality is also significantly enhanced, meaning we can conclude to improve our operating procedures and refine our tactics more easily."

The new RMV standard also proves more intuitive to operate thanks to a more user-friendly man-machine interface, Capt Camille said: "The Paveway firing mode is now better integrated into the weapon system, and this is a major improvement. Precision of navigation and strikes is also further improved and, in the rear cockpit, the new digital touch screen helps us better understand the evolving tactical situation. We also have a better screen view of the targeting pod imagery."

The Mirage 2000D RMV programme will be completed by the end of the year, when the last upgraded aircraft will be delivered back to the FASF. Thanks to its new weapon system's open architecture, further improvements are already being considered for the type. For example, artificial intelligence could find its way into the weapon system over the coming years, allowing aircrews to automatically detect targets being observed through the targeting pod. AI could also be used for decision support, helping aircrews react rapidly to a threat. afm

Thanks to the Astac pod, the Mirage 2000D RMV fleet plays a crucial role gathering electronic orders of battle

Base Aérienne 133 Nancy-Ochey is a very active air base. Here, an unmarked Mirage 2000D taxies out while an EC 3/3 'Ardennes' aircraft takes off in the background

IT NCC AIR
KUWAIT

Task Force Kuwait

Since 2014, the Italian Air Force contingent in Kuwait has been a composite unit that operates five different aircraft types, mainly supporting Operation Inherent Resolve in Iraq. Riccardo Niccoli reports from Ali Al Salem Air Base

After a request from the Iraqi government for help in confronting the Islamic State (IS) terrorist menace, the United States launched Operation Inherent Resolve (OIR) on June 15, 2014; an operation supported by 84 nations and five international organisations.

At that time, it was estimated that the IS forces amounted to some 30,000 combatants in Iraq and Syria, and at least 600 armoured vehicles. On September 20 that year, the Iraqi government formally requested assistance from the United Nations, which had already issued a first resolution (no. 2170) on August 15 and then a second (no. 2178) on September 27. In the field, OIR was placed under the orders of the Combined Joint Task Force – Operation Inherent Resolve (CJTF-OIR), located at Al Udeid in Qatar, which was led by US Army Central Command (ARCENT) and managed the forces of more than 30 nations. The greater part of the military effort delivered under OIR was conducted by intelligence, surveillance and reconnaissance (ISR) and air assets and IS seemed to have recruited more than 100,000 combatants. Between August 2014 and August 2015, the air elements of OIR conducted more than 45,200 sorties, of which two-thirds were flown by American aircraft. In April 2017, it was estimated that around 70,000 IS militants had been eliminated by the CJTF.

The Building Capability Mission (BCM) operation was launched in parallel in Iraq and was destined to reconstruct and train the Iraqi security forces.

The Italian mission

Italy was part of the coalition. On October 14, 2014, it initiated operation Prima Parthica, named after the Roman Legion stationed in Mesopotamia between the 2nd and 5th centuries AD. On October 17, at the Ali Al Salem Air Base, the Italian National Contingent Command Air – Task Force Air Kuwait (IT NCC-Air – TFA-K) was constituted, placed under the direct control (for Italian national aspects) of the Comando Operativo di Vertice Interforze (COVI, or operational joint high command). The Task Force was structured around a KC-767A strategic transport and in-flight refuelling aircraft from the 14° Stormo (Squadron), deployed to the Abdullah Al Mubarak base, the military area of Kuwait International Airport, together with two MQ-1C Predator A UAVs of the 32° Stormo, stationed at Ali Al Salem Air Base from October 28. The KC-767A was initially engaged in the transfer of the materiel necessary for the constitution of the initial cell of the TFA-K and subsequently has been utilised for in-flight refuelling missions in support of the tactical aircraft of the coalition. As a consequence, constituted under the TFA-K were the Task Group Breus, destined to operate the KC-767A, and Task Group Araba Fenice for the Predators. To complete this first phase, November 22, 2014 saw the activation at the Al-Jaber Air Base, also in Kuwait, of Task Group Devil, involved with four Tornado IDS aircraft in providing the coalition with intelligence, surveillance and reconnaissance missions, with the use of RecceLite pods.

Following the collapse of the IS in March 2018, the threat offered since by jihadi militants was mostly by small cells that

Above: ***One of the F-2000As of the Task Group 'Typhoon' taken while overflying the main runway at Ali Al Salem Air Base***
Italian Air Force/Troupe Azzurra via author

Left: ***A Typhoon of the TG 'Typhoon' taxies during the launch of a new recce mission from Ali Al Salem. This aircraft belongs to the 36° Stormo, as they are taken from all the wings on a rotation basis***
Italian Air Force/Troupe Azzurra via author

had been reorganising and exploiting to the maximum the vulnerabilities deriving from political uncertainties that still reigned in Iraq, complicated by continued widespread protests. In this context, the activities of the IT-NCC Air Kuwait remained focused on confronting the ongoing humanitarian crisis, contributing to the coalition's operations, and supporting the Italian forces deployed to Iraq under Operation Prima Parthica.

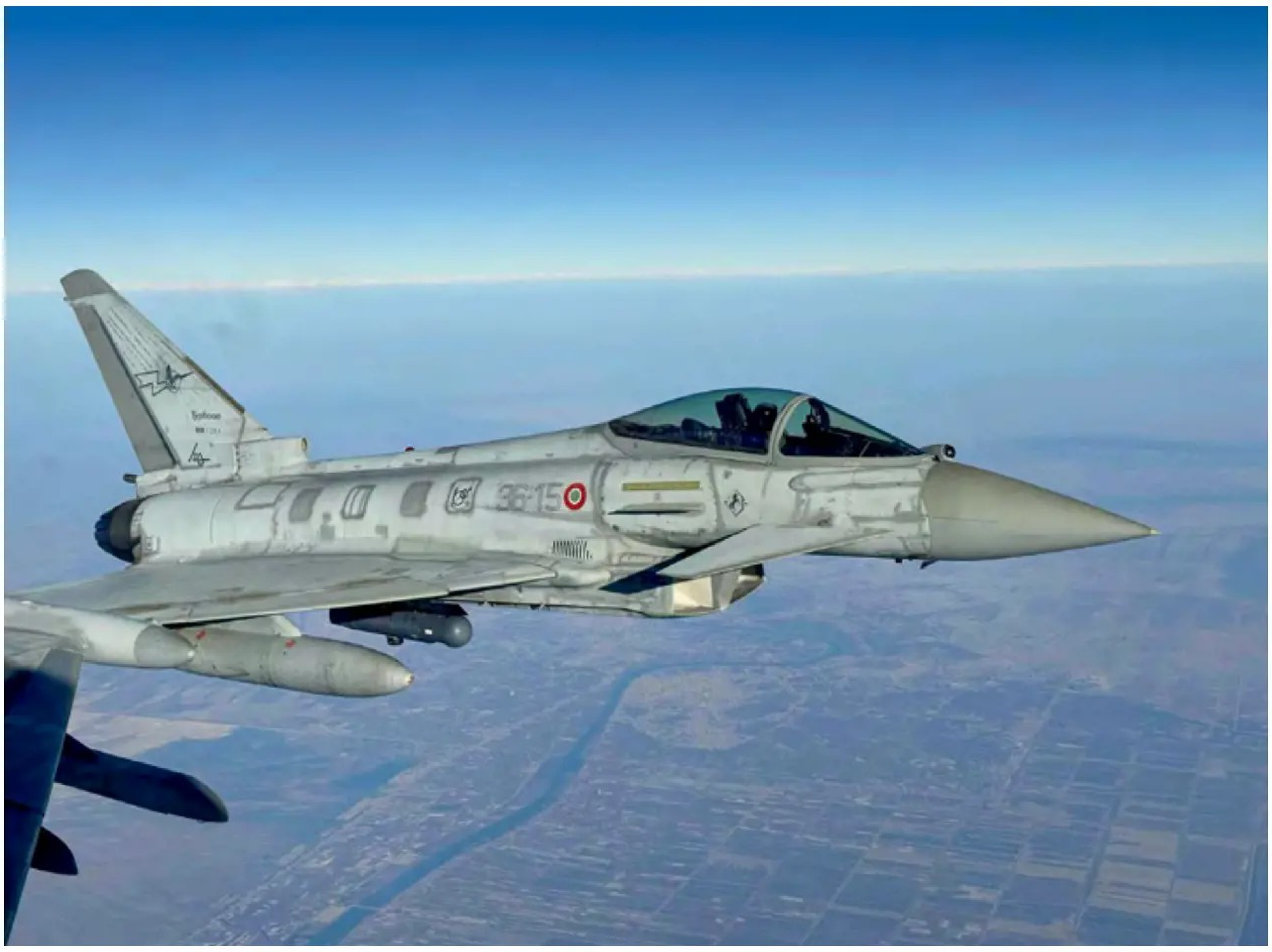
The forces in the area

Today, the TFA-K is structured around four Task Groups (TG) plus one cell that performs different missions. Three units directly support the coalition's activities, engaged in the collection of information, and its elaboration and distribution among the various international contingents.

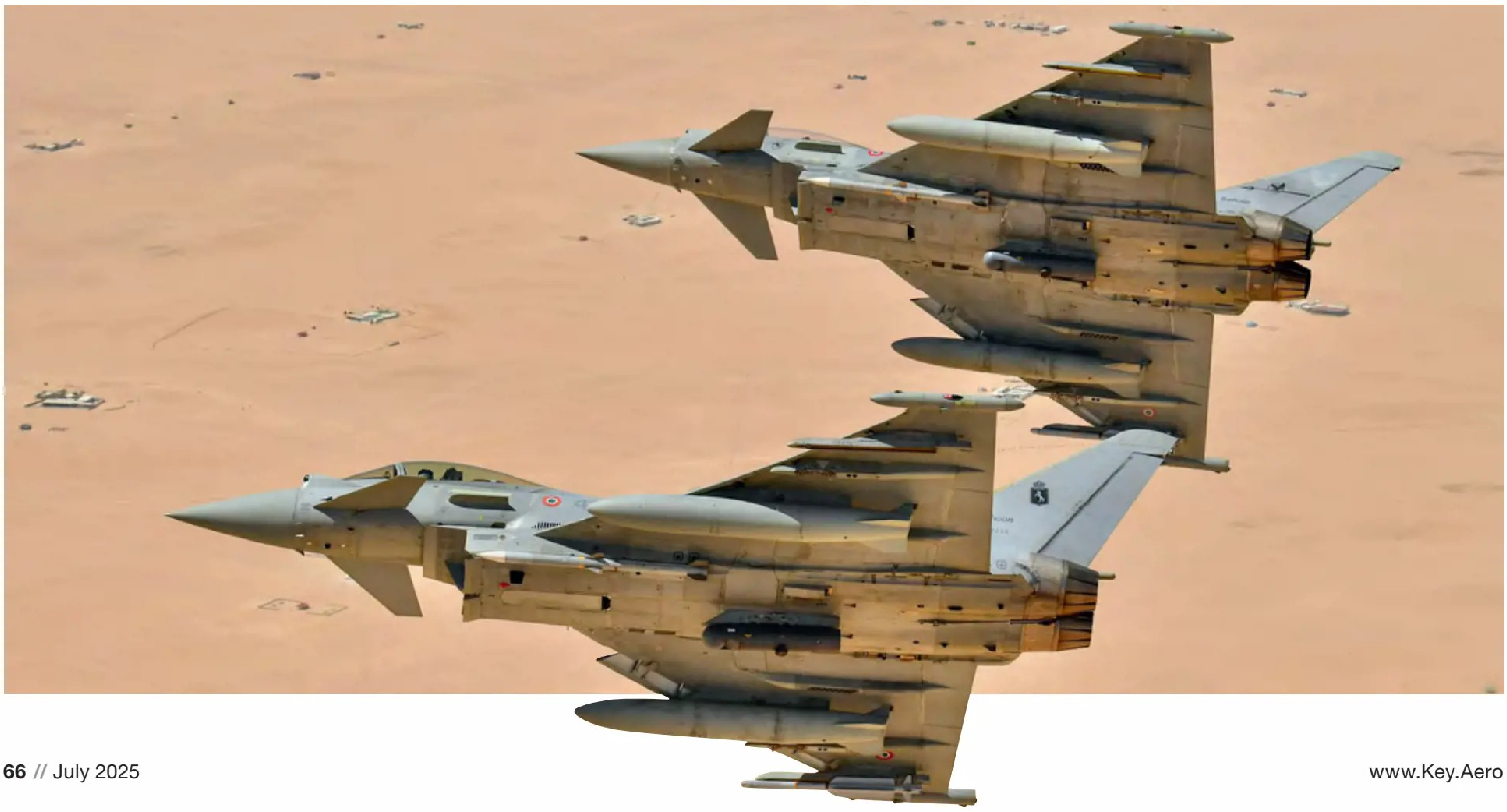
The home of the IT NCC Air Kuwait is Ali Al Salem Air Base, situated around 40 miles (60kms) east of Kuwait City, in the middle of the desert. The base also houses a huge US contingent that utilises a compound known as The Rock, which hosts the logistical infrastructure. Since September 2000, the USAF has maintained the 386th Air Expeditionary Wing, that serves as a hub for Operation Inherent Resolve and offers support to various aircraft, particularly C-130Js in multiple versions and MQ-9A Reapers. A Canadian contingent is also based at Ali Al Salem, engaged in Operation Impact, the Canadian part of OIR. The Italian group is located in the Castra Praetoria compound within the Kuwaiti station, which serves as a logistics base. At the same time, the flying units are deployed to various areas close to the runways.

Task Group 'Typhoon' is based at Ali Al Salem, operating four F-2000A Tranche 1 production fighters and staffed by pilots and groundcrews drawn from all four stormi (wings) that operate the aircraft. Thanks to the RecceLite II pod, these assets perform reconnaissance missions, usually over pre-planned targets. The Air Task Orders (ATO) arrive from the CAOC (Combined Air

Top: ***A Typhoon in the marking of 4° Stormo taken while ready to taxi from its soft shelter for an ISR mission of OIR***
R Niccoli



Left: ***A Typhoon flying high over the Iraqi territory. At the central station is clearly visible the RecceLite II pod***
Italian Air Force/TFA Kuwait



Below: ***A pair of Typhoons flying over the desert. The standard configuration for operation OIR includes one RecceLite II pod, one AIM-120C-5 and one IRIS-T air-to-air missiles, two underwing fuel tanks and ammunitions for the BK-27 gun and for the chaff and flare dispensers***
Italian Air Force/TFA Kuwait

Above: ***The current TG 'Typhoon' commander, Maj Nicola (full name withheld), with two of his pilots, before a mission from Ali Al Salem*** *R Niccoli*

Left: ***A pilot in the cockpit of a Typhoon prepares to carry out a new mission from Ali Al Salem Air Base. Usually, TG 'Typhoon# is called to fly by the COAC at Al Udeid at least one mission per day*** *R Niccoli*

Below: ***Mixed formation of Italian Typhoons and Iraqi F-16Cs during one ACM mission, part of the Partner Nation Integration programme of operation OIR.*** *Italian Air Force/TFA Kuwait*

Operations Center) at Al Udeid, Qatar, where there is also an Italian Cellula Nazionale Interforze (joint national cell), that ensures 24 hours before the mission, that everything is accurately planned and usually involves the targeting of various objectives. The planning data is then inserted into the aircraft and the pod, which generally works automatically when arriving at the prefixed points. Although the RecceLite can transmit the images gathered in real time via datalink, this solution is not used in this theatre, and the cassettes with the data are unloaded from the aircraft only at the end of the missions. These missions are typically flown by two aircraft, which, for safety reasons, are usually armed with AIM-120C-5 AMRAAM and AIM-2000 IRIS-T missiles plus the ammunition for the Mauser BK-27 27mm cannon and chaff and flare launchers. A mission has a duration of around four or five hours. It involves at least two in-flight refuellings, the first soon after take-off, to perform the mission best, considering that the areas to survey usually are relatively distant from Kuwait, located in northeast and northwest Iraq, consequently more than around 500-560 miles (800-900kms) away. The jets are rotated from their home country every two months and fly around 60 hours during their time in the theatre. In September 2022, two F-2000As carried out the most extended ISR mission of Operation OIR, with an eight-hour flight. Maintenance activities at Al Salem are performed by the Nucleo Approntamento Velivoli (aircraft readiness nucleus). They are typically those of the first level, but, if necessary, operations up to the second level can be conducted, thanks to two soft hangars in the tented structures. The aircraft are generally stationed on the flight line and are protected by soft shelters that shade

them from direct sunlight. Yet despite the meteorological and climatic conditions in the zone, with dust and sand in abundance driven by the wind, the Eurojet engines of the Typhoon have no requirement for particular supplementary care to operate, but instead, as explained by the Task Group commander, Maj Nicola D (full name withheld): "They can calmly eat up anything without any problems." The pilots are on two-month detachments, while the remaining personnel are rotated every three or six months, depending on their roles.

The other asset tasked with ISR missions is the MQ-9A Predator B, operated by the Task Group 'Araba Fenice' under Capt Andrea D (full name withheld) and also based at Ali Al Salem. This remotely piloted aircraft, detached from the 28° or 61° Gruppo of the 32° Stormo, and which for the moment is still the Block 1 version, is capable of flying missions that can last as long as 24 hours, and is today assigned solely to the OIR operation. Between October 3, 2021 and June 27, 2024, the TG was also assigned to the AGENOR/European Maritime Awareness in the Strait of Hormuz (EMASoH) operation under the aegis of the European Union. With the new Predator Block 5, already operational

Top: ***On October 18, 2024, the Italian Air Force changed the ISR Task Group, recalling home the TG Devil and its Tornados, and deploying TG 'Typhoon'***
Italian Air Force/TFA Kuwait

Below: ***The KC-767A deployed to Kuwait is mainly for in-flight refuelling operations on behalf of the coalition fighters. Here it is refuelling a Typhoon of the Royal Air Force***
Italian Air Force/TFA Kuwait

Bottom: ***The KC-767A of TG Breus is based on the Al Mubarak Air Base, the military side of the Kuwait international airport***
R Niccoli

AERONAUTICA MILITARE

AERONAUTICA MILITARE

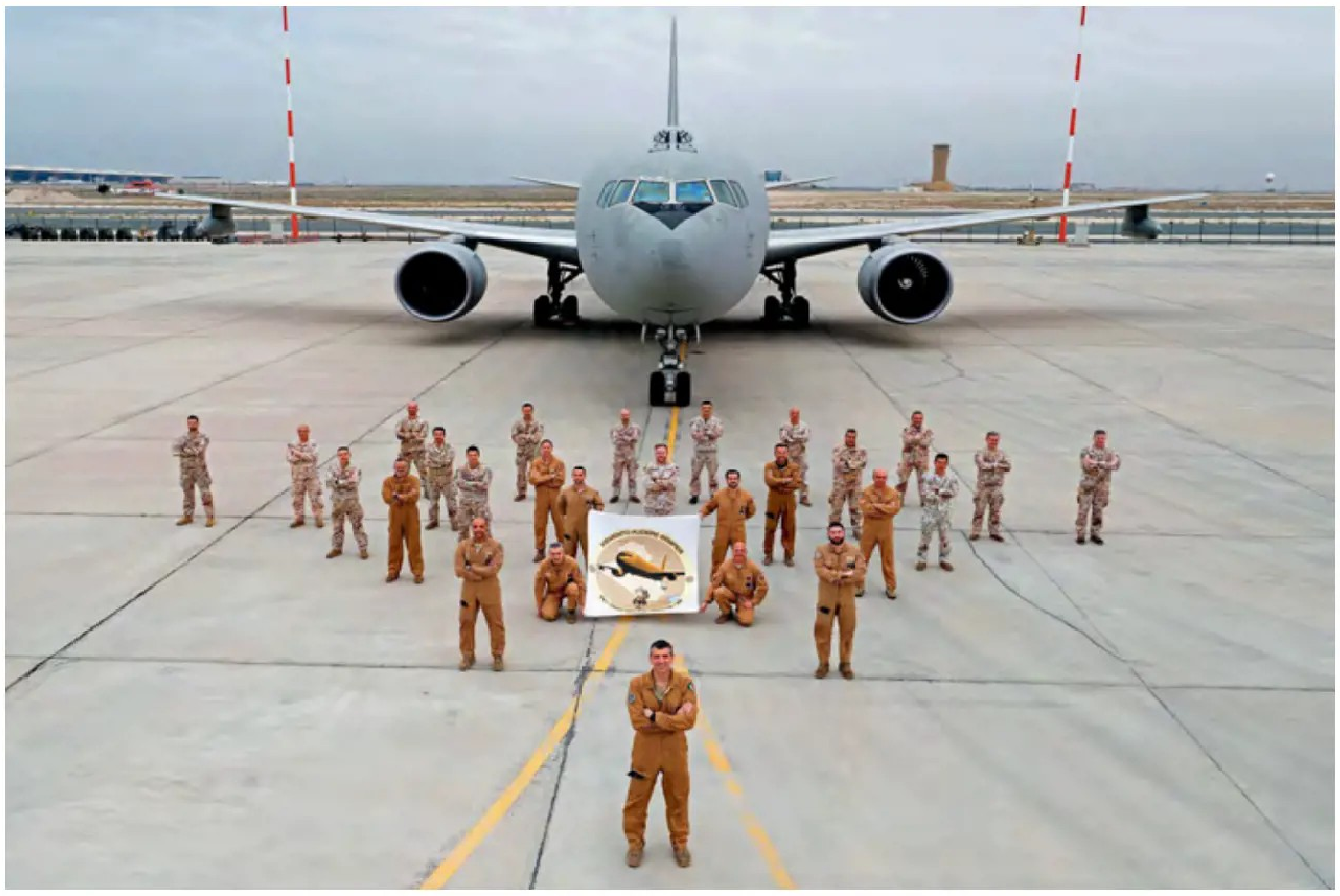
Above: ***The cockpit of the KC-767A while the aircraft is readied for a liaison flight to Italy***
R Niccoli

Top Right: ***Personnel of TG 'Breus' with its aircraft, taken on one of the aprons of the Al Mubarak Air Base***
Italian Air Force/TFA Kuwait

Bottom: ***The TG 'Araba Fenice' is based at Ali Al Salem and operates one MQ-9A Predator B, for ISR missions that require high persistence over targets***
R Niccoli

in Italy, the aircraft when deployed will operate with the MTS-A payload and the Block 15 Mobile Ground Control Station, which continues to deliver the requested capabilities. The Predator operates according to the ATOs coming from the CAOC against pre-planned targets and, thanks to their persistence in the area of operations, they can monitor the development of activities in a particular zone or at a precise target over time. Today, IS activities are very fragmented, conducted by small cells with limited equipment and vehicles, and it is still always important to understand the dynamics that characterise the various jihadi groups.

For example: if the two Task Groups mentioned are the strong arm of the Italian ISR mission, the brains behind these operations, the unit tasked with collecting, processing, evaluating, integrating and disseminating the information is the I2MEC, the Integrated Italian Multisensor Exploitation Cell, which at the time of the author's visit was commanded by Lt Col Vincenzo P (full name withheld). Raw videos and imagery collected by ISR assets arrive and are processed and analysed on behalf of the interested commands. Each image goes through a dedicated specialist, trained at the Scuola di Aerocooperazione Interforze (joint air co-operation school), who has gained solid experience during exercises and real operations in the field, in Italy and abroad; this analysis pinpoints nuances that would otherwise have remained hidden.



The I2MEC cell interacts with the command structure of the coalition. It is not only tasked to analyse the imagery but also can request new missions to explore situations in greater depth. The work concentrates on the gaps, those holes in information about the enemy, and, through a precise scientific approach to the problem, seeks to fill the information holes. Subsequently, the final product is disseminated to all the agencies and units of the coalition. Similarly, the I2MEC receives the analysed results from other cells of nations with a similar structure in the theatre, namely France and, above all, the United States.

The third TG under TFA-K is 'Breus', which continues to use a KC-767A to transport personnel and equipment and perform in-flight refuelling missions. Commanded during our visit by Maj Daniele B, the 'Breus' is based at Abdullah al-Mubarak, as the KC-767 is too heavy for daily operations from the runways at Ali Al Salem. This base also does not possess the support equipment necessary for an aircraft with commercial airliner characteristics. This situation creates some difficulties, as the personnel are housed at Castra Praetoria and have to commute between the two bases every day – around a one-hour coach trip, with all the problems that this creates. Unfortunately, there are no plans to make Ali Al Salem more suitable/ The KC-767A, detached on rotation from the 14° Stormo, operates as an in-flight refuelling platform primarily for the Italian F-2000As, but is also available to refuel the other fighters of the coalition. However, of similar importance is the fact that this fleet also supports all the Italian Prima Parthica contingents, with weekly movements of personnel and supplies, a not insignificant undertaking, considering the five hours' flying time between Pratica di Mare Air Base and Kuwait, and the limited fleet available, which is still held at just four KC-767As, which are required to satisfy all the strategic needs of the Italian Air Force and the entire Italian defence establishment. The aircraft are rotated through Italy an average of once

WELCOME TO
CASTRA PRAETORIA
IT NCC AIR
KUWAIT

Top Left: ***The TFA Kuwait also controls the TG 'Albatros', operating one EC-27J JEDI, which is deployed to Erbil Air Base in Iraq, to grant direct support to coalition troops on the ground***
Italian Air Force/Troupe Azzurra via author

Top Right: ***Badge marking the gate of the Italian logistic base at Ali Al Salem Air Base R Niccoli***

Bottom: ***One C-130J Hercules is assigned to the TG 'Medal', operating from Ali Al Salem Air Base. As can be seen, the local weather conditions can be quite difficult for aircraft and personnel***
R Niccoli

a month for maintenance purposes, while the TG flies around 1,000 flying hours yearly.

The fourth and final Task Group of the TFA is 'Albatros', which is housed at the Erbil base in Iraq, as it directly supports the land forces in the theatre. This small TG operates the EC-27J JEDI (jamming and electronic defence instrumentation) aircraft, an electronic warfare platform dedicated to the electromagnetic attack on the improvised explosive devices (IEDs) that IS militants use to attack coalition forces. The latest version of this classified machine, designated JEDI-2, possesses mission apparatus capable of covering a greater portion of the electromagnetic spectrum with wider surveillance and expanded data-link functions.

Finally, a fifth TG at Ali Al Salem reports to the IT NCC Air, but is not incorporated in the Task Force Air. This is TG 'Medal', equipped with one C-130J transport aircraft provided on a rotational basis by the 46^ Brigata Aerea. This unit does not directly support Operation Inherent Resolve, but supports the other Italian missions in the area. 'Medal' is engaged in providing a tactical transport capability to the NATO Mission in Iraq (NMI) operations, a training mission involved with the Iraqi security forces, and in this context supports the Italian troops in operation Prima Parthica deployed at Erbil and Baghdad. It supports the Italian base in Djibouti and the European Union Training Mission (EUTM) in Somalia, operating liaison flights to Mogadishu. Here, training and advisory activities are conducted on behalf of the Somali Ministry of Defence through the Mentoring Advisory Training Element (MATE), for which, since February 2014, Italy has been providing the mission commander. These transport and liaison operations were previously conducted from the Forward Logistic Air Base at Al Minhad, in the United Arab Emirates. However, in July 2021, the Emirati authorities withdrew permission for Italy to utilise this base. This diplomatic crisis forced the Italian defence elements to leave the base (on which had invested €50 million) at a critical moment, on the eve of the abandoning Afghanistan under the evacuation operation Aquila Omnia.

Other commitments

The Italian Air Force contingent in Kuwait is not solely engaged in the activities of OIR – since 2024, it has also been performing Partner Nation Integration (PNI) activities with the Iraqi Air Force. The first bilateral exercise, also under the aegis of the OIR coalition, was staged in 2024 and saw the involvement of the Tornados of Task Group 'Devil'. This year, the activity was repeated in April, in an exercise designated UR2, held at Balad Air Base, which saw the participation of the Iraqi F-16C/D Block 52s alongside Italian F-2000As, EC-27J, C-130J and UH-90As (of the Italian Army), personnel of the Italian National Contingent Command Land at Erbil and personnel of Task Force 44 in Baghdad.

This cross-training activity tests the tactics and procedures of various mission types, both air-to-air and air-ground, to reinforce interoperability of the assets and the capacity for joint intervention, including the fixed-wing and helicopter components and the special forces. It would appear that the Iraqis aspire to programme these activities on a six-month rather than an annual basis. Task Group 'Typhoon' continues to conduct joint operations with the Iraqi F-16 force, predominantly in ACM (air combat manoeuvre) missions – Maj Nicola D confirmed the Iraqis have "extremely high professional capacities, certainly matching those required to conduct joint operations with NATO air forces".

To conclude, the current commander of the Italian contingent in Kuwait, Col Fabio Bergamini, said: "For us, it is important to remain in this area; Ali Al Salem is a hub for all the Middle East and there is an interest in maintaining it. We have a perfect relationship with the Kuwait Air Force, whose personnel are highly collaborative, hospitable, open and do not consider our presence invasive."

As for the IT-NCC-Air, the commander continued: "I very much appreciate the complexity of the various assets and the uniqueness that this command represents is a truly exceptional experience." Finally, given the threat that OIR confronts, he said: "Islamic State is no longer as important a threat as it was at the start, but there is always a requirement for our contribution in the area."

The Italian contingent in Kuwait has been present for almost 11 years, supporting the activities connected with Operation Prima Parthica and all the Italian armed forces in the Middle East and the Horn of Africa. This strategic presence also contributes to the consolidation of Italian authority and presence internationally, and it is thought that this presence in the area will continue for many years to come. **afm**

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Entering the F-35 era

Gérard Gaudin travelled to Luke Air Force Base in Arizona to observe the first Belgian pilots to convert to the F-35A Lightning II

A frontal view of a BAF F-35. Note the removable Luneburg lens-type radar reflectors under the fuselage

Belgium decided in October 2018 to procure 34 F-35A Lightning II multi-role fighters using the Foreign Military Sales (FMS) procedure, joining a group of European countries (Denmark, Norway and the Netherlands), members of the initial F-16 consortium that were already partners of the Joint Strike Fighter (JSF) programme.

After a long prospection, the F-35 won the competition against the only other candidate, the Eurofighter promoted by the UK. France had proposed the Dassault Rafale in the F3R version, but outside the framework of the Request for Governmental Proposal (RfGP) imposed by the Belgian government.

The rollout of the first Belgian F-35 took place at Lockheed Martin's Final Assembly and Check-out (FACO) in Fort Worth, Texas, on December 10, 2023, in presence of the then Prime Minister, Alexander De Croo, to show the importance of this event and of the transatlantic relationship.

Eight aircraft delivered in two months

The first eight stealth aircraft (serial FL001 to FL008) were delivered more than six years later, from Fort Worth to Luke AFB in Arizona. And the first flight made by a Belgian pilot, Lt Col Pierre-Yves Libert, callsign 'SO6', took place on December 12, 2024.

Libert is now the deputy commander of the 312th Fighter Squadron (FS), stationed at Luke AFB, in the suburbs of Phoenix, also known as the Belgian F-35 Conversion Unit. The 312th FS is integrated within the 56th Fighter Wing, the largest fighter wing in the United States Air Force and part of the Air Education and Training Command (AETC).

The main mission of the unit is to train the fighter pilots on the F-35A. The base hosts almost 5,300 people, including a large number of civilians working for contractors like Lockheed Martin and Pratt & Whitney, which produces the F135 engine that equips all the Lightning IIs. Some 400 pilots from the US, Denmark, Italy, Norway and the Netherlands are trained annually. There are

Gear down, a Belgian F-35A flying in March above the Arizona desert around Luke AFB.

Two BAF F-35As in formation in the sky above Arizona. They carry coloured national roundels. The FL007 flies without Luneburg lens-type radar reflectors

Libert and Maj Nicolas 'Fringe' Verbraken, were the first Belgian pilots and have already completed their conversion on the F-35 at Luke on their way to becoming IPs. Six others, coming from the four Belgian combat squadrons, have joined the training phase.

The training programme includes theoretical courses, the use of flight simulators as well as live flights above the Arizona desert. Three types of syllabuses have been initiated by the BAF for the conversion of an initial batch of 48 pilots until 2028 – although the contract with the European Air Transport Command (EATC) will probably be extended to the early 2030s for optimal use of the facilities.

The transition course (T-X) is reserved for some 28 F-16 pilots having at least 500 hours of experience on this fighter and lasts five-and-a-half months.

currently six F-35 fighter squadrons flying at the Arizona base which still hosts a F-16 unit of the Republic of Singapore Air Force, the 425th Fighter Squadron.

Two contractors also provide red air (adversary training/aggressor) services: Top Aces, flying ex-Israeli F-16s, and Airborne Tactical Advantage Company (ATAC), using Mirage F-1s acquired from the French Air and Space Force.

The 312th Fighter Squadron

The 312th FS is commanded by a US officer, Lt Col Jason 'Chill' Wall, with Libert as a deputy. The Belgian F-35 Conversion Unit comprises 17 Belgian officers and NCOs, and between six and nine USAF Instructor Pilots (IPs). Libert leads the Belgian Conversion Unit (BCU). He is also the Belgian senior national representative (SNR) at Luke. In the coming years the squadron will train more than 48 fighter pilots and more than 120 ground technicians.

Two Belgian F-35As break the formation during a training flight from Luke AFB

The serial (FL001) of the first Belgian F-35 is clearly visible just behind the door of the air-to-air refuelling system

F-35 FL001 showing its upper fuselage and the radar reflectors on the top of the aft fuselage

In March 2026, a B course will start for young pilots coming straight from the Euro-NATO Joint Jet Pilot Training Program (ENJJPT), conducted by the 80th Flying Training Wing at Sheppard AFB, Texas on T-6 Texans and T-38 Talons. For them, the training will last seven-and-a-half months and will include theory, 45 simulator sorties and 37 "real" sorties.

The Instructor Pilot Upgrade (IPUG) course is scheduled at a later stage.

On July 21, the Belgian Air Component (BAC) will be replaced by the Belgian Air Force, which is now considering the conversion of some high-ranking officers with a leading position in the Air Staff.

Technicians have started their formation at Eglin AFB, Florida, under the supervision of experts from Lockheed Martin. They generally spend ten months in the United States – first at Eglin and then at Luke for on-the-job training on the Belgian planes, with the assistance of 48 civilian technicians provided by the manufacturer.

A technological leap

Maj Loïc Van Himsthe is the director of maintenance operations, he praises the "technological leap" represented by the fifth-generation fighter compared to the F-16, developed in the late 1960s and which flew for the first time in January 1974.

Availability is higher (more than 80% for the Belgian aircraft stationed at Luke, according to Libert) and the concept of predictive maintenance doesn't require the grounding and the disassembly of a F-35 for inspection every 300 flying hours. The aircraft itself reports failures to the aircrew, but also to the ground personnel. The Mean Time Between Failures of the still small Belgian fleet is ten hours. Since early December, 96% of the planned sorties have been completed. And no engine change has taken place, according to Libert.

An immense training range

Luke AFB, the F-35 university, also has a lot of assets, according to the USAF and the Belgian pilots. An integral part of Luke's fighter pilot training mission is the Barry M Goldwater Range. The range consists of 1.8 million acres of relatively undisturbed Sonoran Desert southwest of Luke, between Yuma and Tucson. Overhead are 57,000 square miles of airspace where pilots practice air-to-air manoeuvres and engage simulated battlefield targets on the ground, including Russian SAM system replicas. Roughly the size of Belgium, the immense size of the complex allows for simultaneous training activities on nine air-to-ground and two air-to-air ranges.

An all TR-3 fleet

The eight jets flying from Luke are all built to the latest standard, the so-called Technology Refresh 3 (TR-3), which brings improvements, like larger displays in the cockpit. The upgrade known as Sidekick also gives them the ability to carry six (instead of four for older versions) AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAMs) in their internal weapons bays while remaining in Very Low Observable stealth configuration, according to Lockheed Martin.

The next four (c/n AY-09 to 12, serials FL009 to FL012) are still being assembled at the Lockheed Martin Aeronautics Air Force Plant #4 in Fort Worth. They will incorporate the latest "combat tape", according to the

Like all the Belgian planes stationed at Luke AFB, the F-35 FL003 carries its US serial on the right landing gear door. In this case 22-5764
Gérard Gaudin

The typical F-35 Helmet Mounted Display (HMD) adapted to the morphology of every pilot. It is supplied by RCEVS - a joint venture between Elbit Systems and Rockwell Collins *Gérard Gaudin*

The 312th FS has inherited a maintenance hangar from a previous F-16 squadron. FL006 is receiving attention from the ground crews *Gérard Gaudin*

Belgian Air Force commander Maj Gen Geert De Decker. They should arrive in Belgium, at Florennes Air Base, in early October, where the infrastructure – including the installation of four Full Mission Simulators – is still being finalised.

The base, located in the French-speaking part of the country, has been completely refurbished, with the renovation of the runways, the construction of a huge, dedicated F-35 complex costing €300m that is not visible from the outside. A similar facility, with the same very high level of security, is under construction at the other Belgian fighter Main Operating Base (MOB), Kleine-Brogel, in the northeast of the country.

Deliveries to Kleine-Brogel in 2027

The leader of the formation, which will cross the Atlantic in two days, is already known. Currently still in training at Luke AFB, callsign 'Cortex' (his real identity is kept secret for security reasons), will then become the commanding officer of the 1st Squadron, part of the 2nd Tactical Wing.

The next four F-35As are expected at Florennes in 2026. The deliveries to Kleine-Brogel, home of the 10th Tactical Wing, will start in 2027 and should be completed in 2030. The F-16s will be retired at the end of 2028.

But the Belgian Prime Minister, Bart De Wever, confirmed on April 2023 that his government is considering the purchase of an additional F-35As. The jets could come from the Italian FACO, located at Cameri Air Force Base, to give them more European content. At least 11 more aircraft would be purchased, to reach the 45 combat planes requested for years by NATO.

The Belgian flight simulators will also be available for Polish F-35 pilots, according to the ministers of defence of the two countries, Theo Francken and Wladyslaw Kosiniak-Kamysz, who signed a Letter of Intent on May 12.

New weapons

Francken also announced on April 24 that his ministry would acquire additional air-to-air missiles for the F-35 fleet, including new AMRAAMs as well as an undisclosed number

The two Belgian instructor pilots on F-35s: LtCol Pierre-Yves Libert, the detachment commander, and Maj Nicolas Verbraken *Gérard Gaudin*

A BAF F-35 retracting its landing gear after an approach at Luke AFB
Gérard Gaudin

of Joint Strike Missiles. The latter is a multi-role, air-launched cruise missile under development by the Norwegian company Kongsberg Defence & Aerospace and the American company Raytheon Missiles & Defense.

In July 2024, the US Defense Security Cooperation Agency announced the approval by the State Department of a Foreign Military Sale to Belgium of 196 Guided Bomb Unit (GBU)-53/B Small Diameter Bombs-Increment II (SDB-II) All-Up-Rounds (AURs), for an estimated cost of $115m.

More dispersion in the future

The Belgian Air Force is looking for more international co-operation for the day-to-day training of F-35 pilots. This high-tech plane needs a far larger airspace in which to operate, and this can only be found abroad. With the growing Russian threat, Air Staff have begun studying various options to disperse the F-35s to outside the two MOBs, both in Belgium and elswhere, and to reduce the vulnerability of the fleet. With its twin tail, the F-35 is too tall for the hardened aircraft shelters built during the Cold War to protect the combat aircraft from Soviet airstrikes.

The new NATO doctrine emphasizes the concept of Agile Combat Employment (ACE), described as “an operational scheme of manoeuvre designed to improve resilience and survivability while generating air combat power from both home bases and geographically dispersed locations”. **afm**

The Scorpions

The Belgian F-35 Conversion Unit (BCU) has taken over the designation of the 312th Fighter Squadron, the ‘Scorpions’. The unit was constituted on July 16, 1942, and activated six days later at Dale Mabry Field, Florida, to train, within the 338th Fighter Group, pilots and crews.

It initially flew the Bell P-39 Airacobra. The squadron’s mission was to act as a Replacement Training Unit (RTU). RTUs were oversized units that trained individual pilots of aircrews following their graduation from a flying school.

In June 1943, the 338th Group began a split organisation and the 312th and 441st Fighter Squadrons moved to Perry Army Airfield, Florida.

After September 1943, the group focused on Republic P-47 Thunderbolt training, although the squadron had some Curtiss P-40 Warhawks until its disbandment on May 1, 1944.

Forty years later, it was reactivated and redesignated as the 312th Tactical Fighter Training Squadron at Luke AFB, becoming the first General Dynamics F-16C Fighting Falcon training squadron in the USAF. It was activated on October 1, 1984, but deactivated again on January 18, 1991, just before the end of the Gulf War.

The squadron, redesignated as 312th Fighter Squadron on May 2, 2023, and activated one month later, now trains specifically the Belgian pilots and support personnel on the F-35 Lightning II. This training will probably continue at Luke until the early 2030s.

The F-35A FL007 shows its USAF serial (23-5947) before take-off, next to a US aircraft
Gérard Gaudin

Checkmating SAMs

Suppressing or destroying enemy air defences (SEAD/DEAD) is fundamental to achieving air superiority at war. It holds the highest priority in what is known as the offensive counter-air operation (OCA). Its success serves as a golden ticket for the rest of the formations, allowing them to proceed and execute their missions with complete ease. **Mina Adel** reports

ECTOR's Ukraine Air Force MiG-29 fires an AGM-88 HARM at Russian SAMs a few months ago. It's a dangerous role and the Ukraine Air Force has already lost at least one F-16 while trying to identify itself by firing a missile at them
UkrAF/Ector

THE SEAD/DEAD mission requires extraordinary efforts from various systems and extensive training for specialised pilots. Despite these preparations, it remains one of the most challenging combat missions due to the inherent risks posed by enemy fighter jets or ambushes from widespread air defence systems—something witnessed in the war in Ukraine.

AFM contacted experts and pilots who have participated in similar operations to get their thoughts on such a deadly mission. This distinguished group includes: Samuel Bendett, an adjunct senior fellow at the Center for a New American Security (CNAS), specialising in unmanned aerial systems; Mustafa Onur Kara, a retired Turkish F-16 instructor pilot; Dave Kurtz, a US Navy tactics instructor with 2,500 flight hours in the EA-6B and EA-18G; Daren Sorenson, a former USAF F-15E pilot and war veteran; and a Ukrainian MiG-29 fighter pilot with the callsign 'ECTOR' (full name withheld).

Russian integrated air defence systems (IADS), including multi-layer systems such as S-400, Buk and Pantsir *Russian MOD*

A game of chess

Victory cannot be achieved without a flexible strategy based on careful observation of the opponent. The same principle applies to SEAD (Suppression of Enemy Air Defence) operations. They require multiple steps to be executed effectively and successfully while ensuring the safety of aircrews.

Surveillance may be the most crucial step in developing the right strategy to initiate this operation. It requires specialised aircraft such as the RC-135W Rivet Joint, RQ-4 Global Hawk drones and the P-8 Poseidon to map out threats. This process can be carried out through three types of mission: signals intelligence (SIGINT), which involves the interception of signals; communications intelligence (COMINT); and electronic intelligence (ELINT).

According to the USAF's Counter-Operation Doctrine publication: "SEAD Planners should co-ordinate with intelligence personnel to ensure collection and exploitation opportunities are considered before destroying or disrupting emitters."

SEAD operations fall into three main categories: area of responsibility (AOR), joint operations area (JOA) and air defence system suppression – which targets highly capable air defence assets, resulting in the most significant degradation of the enemy's system; localised suppression, which is generally confined to geographical areas associated with specific ground targets or friendly transit routes; and opportune suppression – usually unplanned and includes aircrew self-defence and attack against targets of opportunity. The JFC or joint forces air component commander (JFACC) establishes specific rules of engagement (ROE) to permit the conduct of opportune suppression.

"One moment you're the hunter, and you become the hunted in the blink of an eye."

Daren Sorenson explained: "SEAD/DEAD missions are the ultimate game of cat and mouse. One moment you're the hunter, and you become the hunted in the blink of an eye. Developing and executing sound tactics against an enemy IADS (integrated air defence system) is going to be a key pillar in your establishment of air dominance and air superiority in the early days of a conflict. Strategic SAMs will be early targets that will be struck with a variety of resources. Still, the tactical/mobile SAMs often prove to be the most resilient and difficult to neutralise in the IADS rollback phase of a campaign.

"To locate an enemy tactical SAM system, you often have to hang it out there, and someone's got to be 'hung out' for them to target. Their location constantly changes, and you don't know where they are until they launch their first missile at you or your formation. Starting defensive against a missile in flight is like waiting to get punched in the face before you can defend yourself in a bar fight, not a place you'd like to be. However, tactics evolved to give us the advantage in this high-stakes game of cat and mouse.

"Full-time professionals must study and learn about the most current IADS and how they operate to keep tactics current and effective at defeating them. When planning a DEAD phase of an air campaign, planners need to be patient and let the fight evolve slowly and not try to rush the results. Remember, the enemy always gets a vote."

Sorenson gave an example of how these missions can be performed: "We could stand off in a safe orbit and allow the entire intelligence coalition of systems to work to locate threats on our behalf. Once ISR platforms had located the threat, precise targeting information was passed to the strike aircraft in real time via datalink. Now, we'd utilise appropriate weapons to conduct a kinetic strike to destroy the SAM permanently. Ideally, we'd have a standoff precision weapon to employ and remain outside their engagement zone. Still, if we didn't, we could organise a strike package to add support aircraft such as F-16CM with AGM-88 HARM missiles and possibly electronic warfare EW aircraft like the EA-18G Growler. The combination of jamming and HARM support would often prevent the SAM from acquiring and engaging the inbound strike aircraft before we could release our weapons."

Growlers and Weasels in hunting

Tactical fighter jets are often seen launching anti-radar missiles to destroy enemy systems with direct hits, but the process is far from simple. It requires uncovering radars, jamming their signals and isolating them from other units.

This phase comes in the second step, following attacks on primary and advanced air defence command centres, typically made

The EA-18G Growler is a great weapon for delaying an adversary's SAM system through a combination of radar and communications jamming *Alan Warnes*
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The USAF F-15E Strike Eagle is one of the most capable SEAD/DEAD marksmen with its HARM targeting system under the right engine intake and the Sniper targeting pod seen here under the left one *Alan Warnes*

by fifth-generation fighters. The goal is to strategically disrupt the air defence decision-making cycle while simultaneously tactically eliminating the batteries individually. This gradual erosion creates a corridor – a gap through which bombers can penetrate and strike critical targets within enemy defences.

Dave Kurtz said: “Conducting SEAD missions is incredibly dynamic. The Naval Air Warfighting Development Center (NAWDC) conducts some of the best training in Fallon, Nevada. The planning is robust to ensure the jamming will target the highest priority radars. The plan includes a fallback list, so that if a jet doesn’t launch or a particular jamming pod isn’t working, the coverage is still the best available. The plan would also include anti-radiation missile shooters, with specific targets and tactics depending on the mission. The SEAD lead would let the Strike lead know if the SEAD package doesn’t meet the minimum criteria.

“The EA-18G is a potent tool in the air wing’s arsenal. The Growler can induce delays in an adversary’s engagement sequence through a combination of radar and communications jamming and anti-radiation missiles. The jamming can often deny detection of the aircraft by modern radars, delay detection to allow closer penetration by strike aircraft or induce confusion and doubt into targeting.”

He also gave an example for such missions: “Once the mission begins, the SEAD lead needs to maintain situational awareness of what the strike is doing. If adversary aircraft force the strike package to manoeuvre and alter the ingress route, then the alignment of jamming must also move. The SEAD lead would move the package to ensure alignment and recalculate missile impact times to provide the best coverage. In the Growler, Link 16 enables the jet to adjust the alignment of jamming with the threat and the Strike package more accurately. As the strike progresses, jammers often need to be re-targeted to higher priority threats. Additionally, the Growler needs to be aware of adversary aircraft that could pose a threat, forcing it to manoeuvre and potentially impact jamming.

“Regarding direct engagement with air defence batteries, the choice of munitions – whether missiles or bombs – and the number of jets, play a crucial role. This factor significantly influences mission planning at the tactical level, shaping both strategy and execution.”

Mustafa Onur Kara explained to me that in SEAD/DEAD missions, you must know the flight time of your munition to ensure a safe flight within the SAM zone. This knowledge helps you plan how many seconds you can achieve with a single missile and select attack bombs with appropriate fuse settings: “Using HARM shots can be applied to both SEAD and DEAD missions. Suppression of enemy air defences is achieved through pre-emptive strikes on a location in case the SAM system becomes active. Launching missiles into the sky creates a window for targeting the area. You may need multiple aircraft to complete the mission, depending on whether you aim to destroy the SAM or another target within the SAM zone.”

The era of drones

The Russia-Ukraine war has drawn global attention to the numerous tactical advantages of drones, particularly First Person View (FPV) drones. Despite their simple design, they are now being produced daily by both sides of the conflict using 3D printers. They are controlled via VR goggles to engage targets, with explosive payloads selected based on the type of target they are meant to destroy.

These small drones were responsible for the destruction of nearly 70% of Russia’s armoured forces until both sides began deploying electronic warfare systems to counter and neutralise them. In response, drone designers adapted by guiding FPV drones via fibre optics, providing clear target visibility during attacks, immune to jamming, though at a shorter range than traditional radio-controlled drones.

Additionally, they play a direct role in neutralising air defences through FPV strikes or reconnaissance missions that assist artillery units in confirming and tracking air defence positions. A Ukrainian command and control system known as Delta, has also helped to adjust artillery fire, such as HIMARS (High Mobility Artillery Rocket System), by providing precise target co-ordinates. This advanced ecosystem gathers and integrates information from reconnaissance units and foreign intelligence partners. Delta geolocates enemy units, displays this data on a real-

“The SEAD lead would let the Strike lead know if the SEAD package doesn’t meet the minimum criteria”

The F-35A is a fifth-generation SEAD player, and most air forces will employ their Lightning IIs in this role *Alan Warnes*

Games of drones was the concept utilised by Ukrainian army units to eliminate Russian armoured and air defence units Ukranian MOD

"With the aid of navigation aids, we identified the origin of the missile launch immediately and quickly cued our target pod to this row of trees, providing some cover to the Roland"

time map and shares it with all Ukrainian combat units. Samuel Bendett highlighted newly innovated drone tactics: "Ukraine launched several FPV attacks against Russian air defence systems from uncrewed surface vehicles. These air defence systems were likely not far from shore, but the attack was unexpected. So, anything within six to ten miles [ten to 15kms] from shore could be vulnerable to such strikes.

"Ukraine has set the precedent and is rapidly developing new concepts and tactics. It is now up to European countries to take key lessons from Ukraine's application of these technologies. The Ukrainian military has demonstrated that this approach is viable – so what will NATO's next move be in establishing its tactics and concepts for employing unmanned aerial and surface systems?"

In May, the RAF announced the arrival of StormShroud, a specialised variant of the Tekever AR3 drone (see *The Oncoming Storm*, page 46-48). This platform will carry Leonardo UK's BriteStorm electronic warfare payload and eventually work with RAF F-35B Lightning and Typhoon FGR4 squadrons, creating a truly collaborative capability. By leveraging its radar jamming technology, StormShroud will disrupt enemy IADS, enhancing the survivability and lethality of crewed aircraft.

Blink, and you die.

Sorenson spoke of his experiences in Iraq: "One night over Iraq back in 2003, we thought all the tactical SAMs had been destroyed, but our intelligence folks kept briefing us of a potential threat of a Roland in our planned area. But after several nights of not seeing any indication of the threat, we started to think they had left the area or were no longer a factor otherwise. We were only a two-ship formation of F-15Es and had been tasked with armed reconnaissance over a section of Iraq. Once established, we began to orbit at medium altitude when we suddenly had both electronic indications of a missile launch and a visual of a missile in flight tracking on my flight lead. He called out, defending over the radio, and immediately began evasive manoeuvres and countermeasures to defeat the missile in flight.

"With the help of navigation aids, we identified the origin of the missile launch immediately and quickly cued our target pod to this row of trees, providing some cover to the Roland. Acting in self-defence, we immediately generated a target designation and rolled in to employ a laser-guided 500lb (GBU-12) weapon against the target. Within 30 seconds, we had a weapons impact and destroyed the SAM. While effective, it was clear that waiting to get shot at is not the preferred method of locating small, elusive, tactical SAMs like the Roland."

'ECTOR' remembered his best mission over Kherson: "We carried out this mission to liberate Kherson in co-ordination with other branches of the armed forces. Our objective was to destroy enemy air defence systems such as Buk-M1, Buk-M2 and S-300 using partner-supplied AGM-88 HARM missiles.

"It was a pitch-dark night. The weather was terrible – the cloud base was just 330ft (100m). The command informed us that, due to the weather, we were not obligated to fly the mission, but the decision was ultimately ours. We chose to go. The flight was long and challenging. Visual navigation was impossible due to dense cloud cover, so we flew using instruments and GPS. One of the main difficulties in suppressing enemy air defences is that, before launching the missile, we must climb to an altitude of 3,330ft (1,000m) and be within the enemy radar's line of sight. Once the air defence system detects us and tries to lock on, we launch the missile, then home-in on the radar signal.

"I noticed a bright glow from beneath the clouds as we approached the launch point. Suddenly, a large number of rockets burst out from below. For a moment, I was frozen by the beauty of the scene. I later found out those were HIMARS rockets. After that, my wingman and I completed successful launches and returned home safely. A few days later, intelligence confirmed that we had successfully destroyed a Buk-M1 and an S-300 system."

Indeed, determining a clear winner in the confrontation between jets and air defence systems is impossible due to the continuous advancements in these technologies. Victory always favours those with the flexibility to adapt to battlefield developments, alongside consistent training for such missions.

Ultimately, the composure and focus of aircrews play a decisive role – any breakdown in their performance could force planners to cancel an air campaign entirely. However, drones significantly reduce operational pressure, especially with the integration of artificial intelligence, making these missions safer and more efficient. **afm**

Scrapped! France's Davis-Monthan

Babak Taghvaee looks at the closure of the French Air Force storage facility at Châteaudun

THE FRENCH Air and Space Force (FASF) once had Europe's largest aircraft storage and regeneration facility, located at Châteaudun air base (Base Aerienne 279, BA279), just 100km (65miles) southwest of Paris.

Disbanded in 2021, the Entrepôt de l'Armée de l'air 601 (Air Force Warehouse 601, EAA601) was home to Groupe d'entretien de réparation et de stockage des aéronefs 11/601 (Aircraft Maintenance, Repair, and Storage Group 11/601, GERSA 11/601), the French equivalent of the United States Airforce's AF 309th Aerospace Maintenance and Regeneration Group (AMARG) at Davis-Monthan AFB, Arizona.

On July 20, 2018, it was announced BA279 would disband EAA 601 and GERSA 11/601 by the end of 2021. Multiple private companies were contracted to dismantle and scrap almost 200 aircraft stored in the facility, while others, including 69 Mirage F1 and 21 Mirage 2000 fighter jets, were sold to various companies and air forces worldwide, with a few ending up in museums and historic sites in France.

The disbandment of EAA 601 and GERSA 11/601, and the subsequent closure of BA279, marked the completion of the reform of aircraft storage and regeneration within the FASF. This led to its decentralisation of aircraft and spare part storage within the FASF. Currently, BA120 Cazaux, BA125 Istres-Le Tube, and BA133 Nancy are the last air bases within the air force still housing several aircraft in their storage facilities for spare parts, future regeneration and military use. This article explores the history and current state of the FASF's aircraft regeneration and storage.

The last inventory

When the French government approved the plan to close BA279, there were approximately 280 complete aircraft and dozens of dismantled aircraft stored in various parts of the EAA 601 facilities. They comprised complete and airworthy aircraft, ranging from Embraer EMB-312 Tucano and TB.30 Epsilon training aircraft to Mirage F1CT/CR and Mirage 2000B/C/N fighter jets, housed in 11 humidity-controlled aircraft hangars and five aircraft shelters in the south and north of the airport. These hangars and

AR
Mirage IV A

Right: ***This C-160R R203/'64-GC' was the FASF's last airworthy C-160R Transall aircraft when it arrived at Châteaudun airport on July 15, 2022. The aircraft was delivered to the CANOPEE museum and has been preserved in an open space area since then*** *Babak Taghvaee*

shelters were divided into three sites named North, Poulmic, and Nivouville.

The largest hangar, Poulmic, was surrounded by Mirage IV/IVPs and other fighter jets. Inside it were over 100 aircraft of different types, including Alpha Jet E, TB.30 Epsilon, EMB-312F Tucano, Mirage 2000B/C/N, Mirage F1CT/CR, while three AS.355F1 Ecureuil helicopters, were stored in three cells.

Four hangars at the Nivouville site housed mostly Mirage 2000B/C/Ns, while some of the hangars at the Northern site were dedicated to Mirage F1 and Mirage 2000 storage, with the rest used by GERSA 11/601 for Mirage 2000B/C/N maintenance.

Satellite images taken on January 18, 2018, showed the presence of 157 complete and incomplete aircraft parked outside hangars on various aprons, taxiways, the old German runway, and open spaces at BA279. Among them were 33 N262D/E light transport, maritime patrol, and training aircraft (13 without wings), 27 fuselages of C-160R Transall transport aircraft, 30 Jaguar ground-attack fighter jets and their combat trainers, 28 Mirage F1 fighter jets in different variants (B, C, CT, and CR), five Mirage 2000C fighter jets, two Mirage 2000B combat trainers, 12 Mirage IV/IVPs, 12 Mirage 2000N nuclear strike fighter jets, and eight Falcon 20 business jets in various variants.

Sales to US and India

Between 2018 and 2021, a total of 32 Jaguars, 100 Mirage F1 and Mirage 2000 aircraft

Mirage IVA and IVP nuclear strike bombers of the French Air Force were retired from service between 1996 and 2005. Most were stored at BA279 as they can be seen in this image in 2012. The majority were scrapped between 2018 and 2021 *Maxime Garcia*

from the FASF's stored inventory at EAA 601 were sold to South Africa, the United States, and India. By July 18, 2018, when the final disposition of BA279 was determined, 13 Mirage F1s had already been exported to the US as part of an order placed by Airborne Tactical Advantage Company (ATAC) in July 2017. This order was made up of 63 Mirage F1s, accompanied by 100 spare ATAR 9K50 turbojet engines.

They were delivered by 2020, comprising 26 F1CT multirole fighters, 30 F1CR tactical reconnaissance aircraft, and seven F1B combat trainers. Following successful assembly, ground tests, and test flights, the first of these aircraft was publicly revealed on October 11, 2018, in the ATAC Adversary Center of Excellence (ACE) at Fort Worth Alliance Airport. In addition to the aircraft sold to ATAC, four Mirage F1Bs were procured by Paramount Aerospace Systems in 2018.

The last Mirage F1 known to be stored in one of the controlled environment hangars at EAA 601 was the 'B' model, designated '207'. This aircraft, initially procured by Libya in 2011 but never delivered due to a United Nations Security Council arms embargo, was last observed intact but without an engine on March 2, 2021. Since the closure of BA279, it has not been seen again.

During the final years of operations at EAA 601, 21 Mirage 2000B/C aircraft from the FASF's inventory were sold to India as part of a €27m contract for 24 second-hand Mirage 2000s. The transaction included 19 Mirage 2000C single-seat models and two

Left: **After removing most of its useful parts, the retired Mirage 2000D, 603/'3-XL' was ferried from Nancy to Clermont to be stored at the maintenance facility of the FASF in January 2025** French Air Force

Below: **The CANOPEE museum saved this FASF Mirage 2000N-K3 nuclear strike fighter, 337/'116-BF' from being scrapped in 2018. It is now preserved and displayed in the HM5 hangar of the now closed BA279** Babak Taghvaee

Eight of the FASF C-160R Transall tactical transport aircraft which were once stored at BA279 and were scrapped between 2018 and 2021 *Maxime Garcia*

Mirage IVA/IVPs in the process of getting scrapped at BA279 in March 2021 *Phil Auger*

Damaged by a surface-to-air missile, most likely, one launched by a an Iraqi Army Roland short-range air-defence system during Operation Desert Storm on January 17, 1991, this aircraft was stored at BA279 between 1994 and 2021. It was saved from being scrapped by founder of the CANOPEE museum, Jean-Michel Wuillemain *Babak Taghvaee*

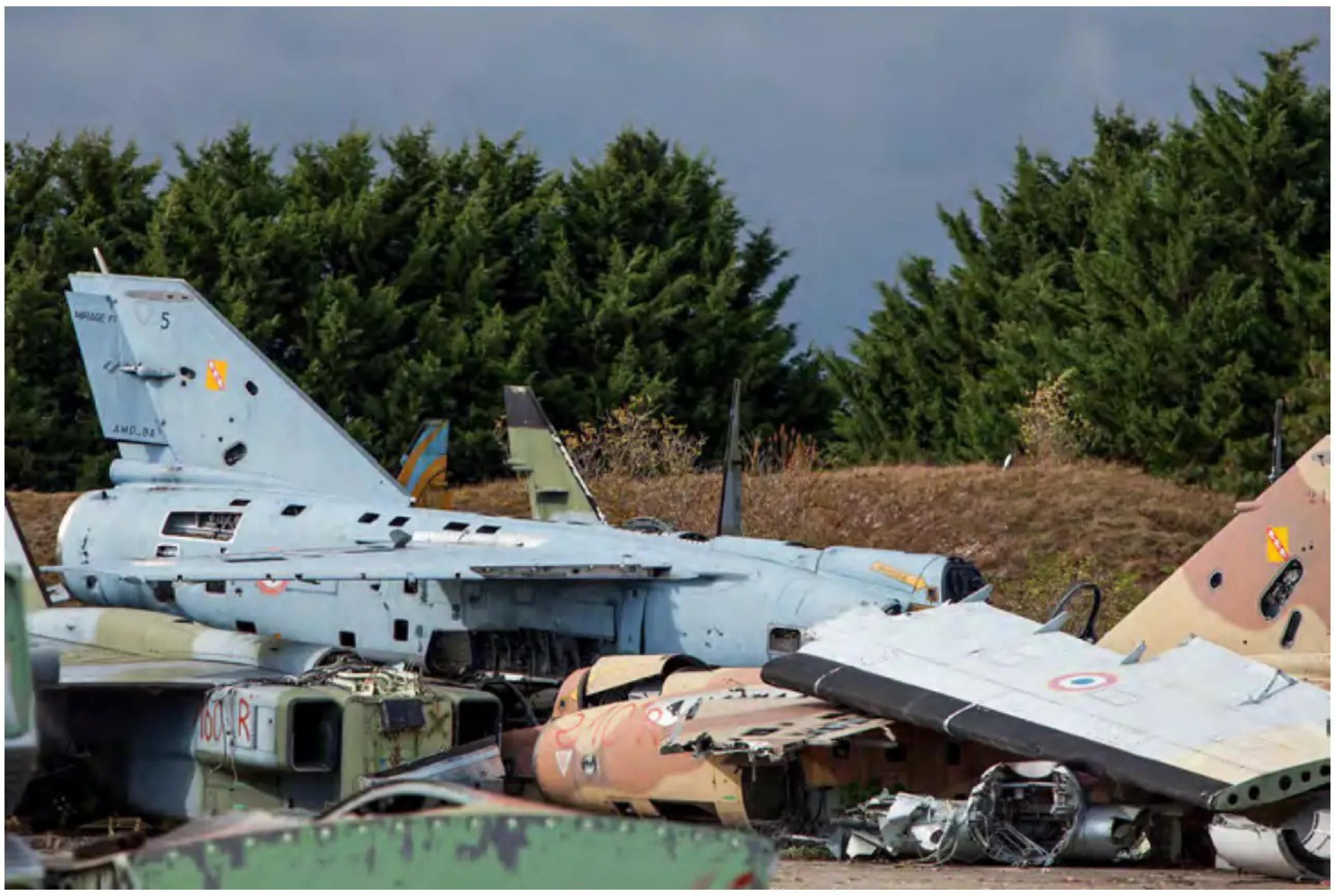
The FASF's aircraft storage and re-generation today

The last unit operating the Mirage 2000C RDI fighter jets, EC 2/5, had 12 Mirage 2000Cs and seven Mirage 2000Bs in service when it was disbanded on June 23, 2022. While the Mirage 2000Bs were earmarked for transfer to EC 2/3 'Champagne' at BA133 Nancy, the Mirage 2000Cs were stored at two of the FASF's air bases: Luxeuil (116) and Istres-Le Tubé (125).

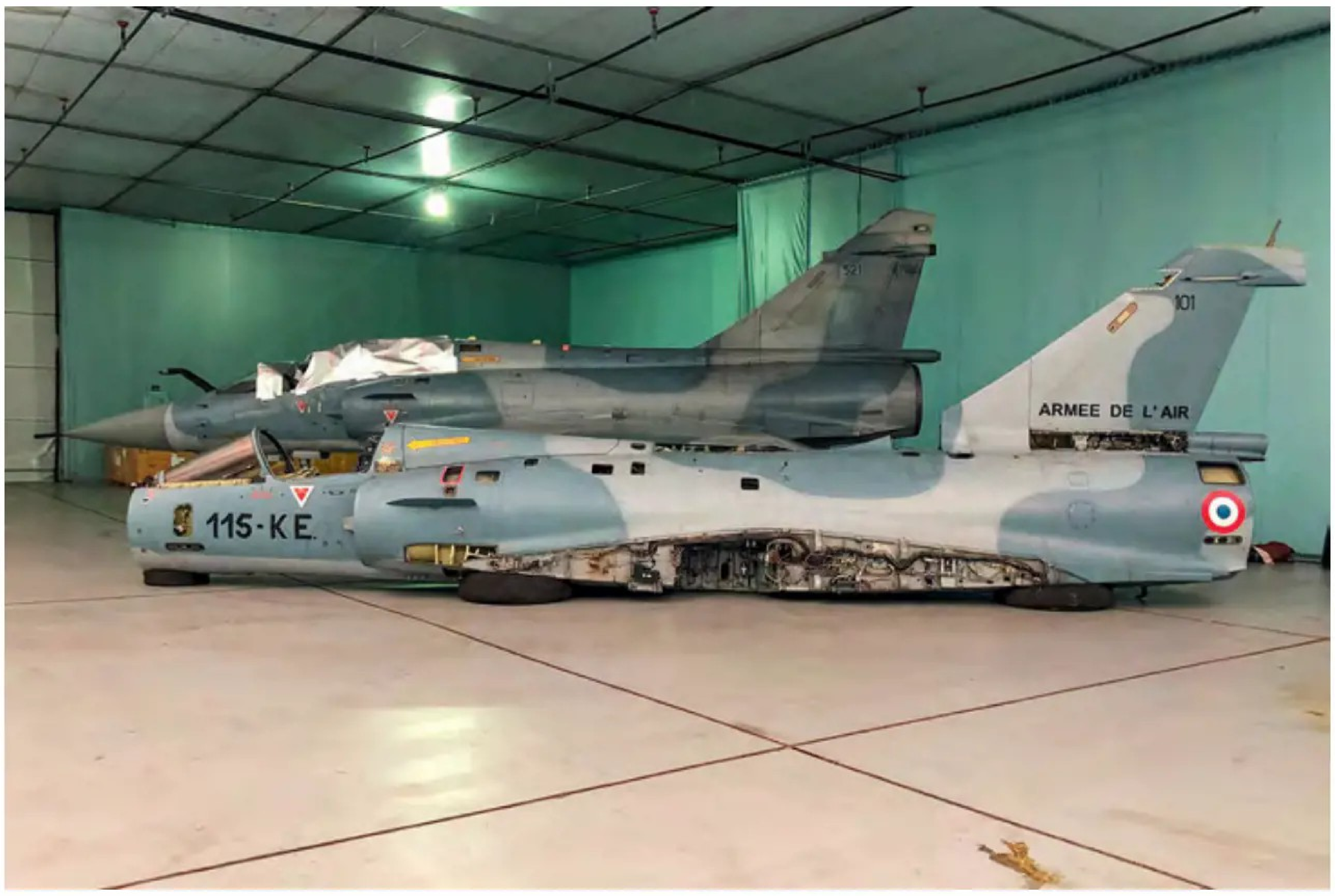
Four Mirage 2000Cs were stored at Luxeuil (121, 122, 123, and 124), while the remaining eight were placed in humidity-controlled storage at Istres (102, 105, 107, 108, 109, 113, 118, and 120). The FASF avoided scrapping these aircraft, as the French Ministry of Armed Forces had initially planned to transfer them to Ukraine. However, in June 2023, this plan was revised, and President Macron authorised the transfer of 12 Mirage 2000-5Fs from EC 1/2 'Cigognes' instead.

It remains unclear whether India's order for 24 Mirage 2000s has been fulfilled following the cancellation of the transfer of Mirage 2000C RDIs to Ukraine. As of March 2025, BA125 still housed six Mirage 2000Cs in its aircraft shelters, where they are being cannibalised for spare parts to ensure the continued airworthiness of the FASF's remaining Mirage 2000Bs. These aircraft are expected to remain in service until their planned withdrawal, with the possibility of transferring four to the Ukrainian Air Force in 2027.

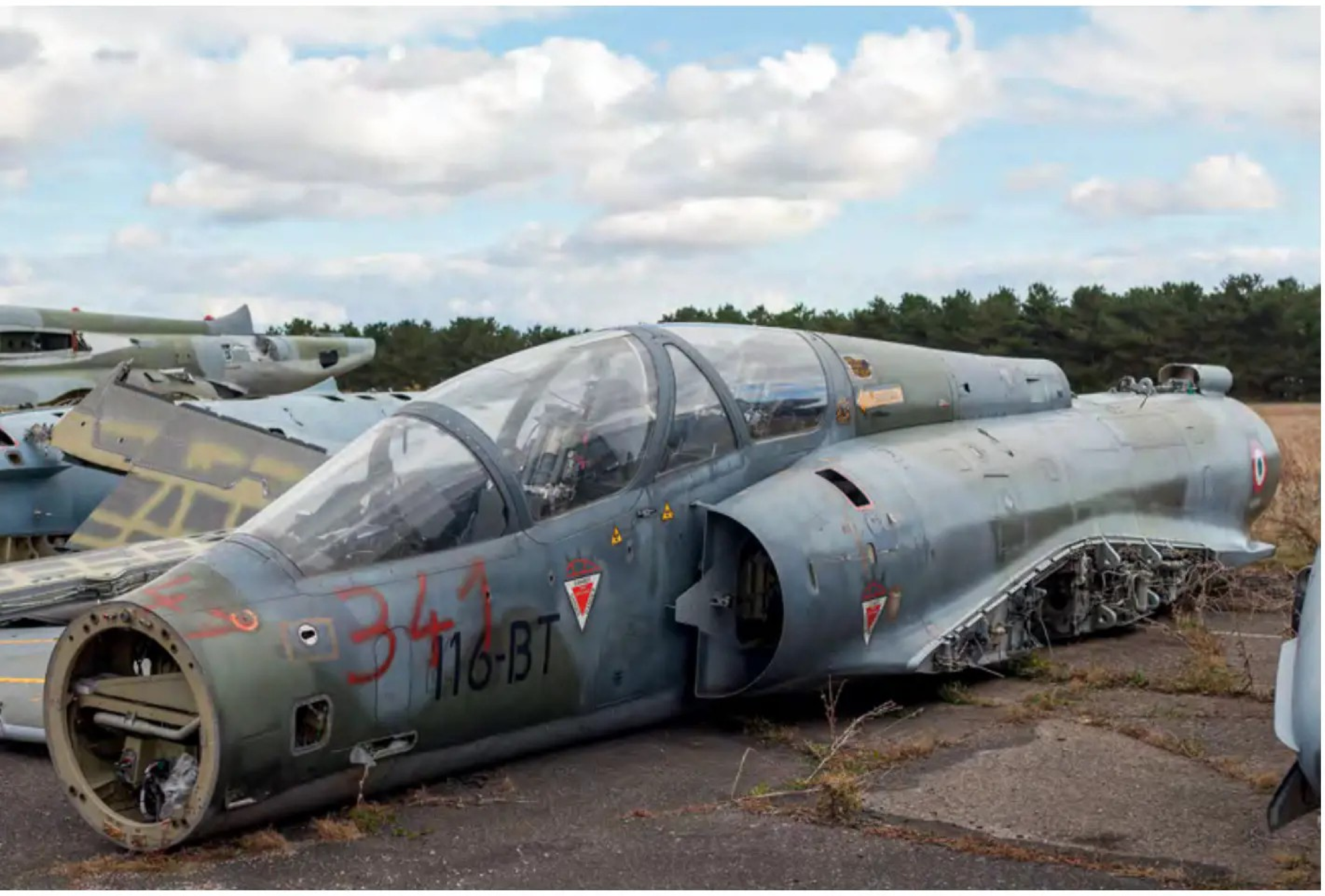
The Mirage 2000Cs stored at BA125 are not the only aircraft preserved in humidity-controlled hangars for potential restoration or use as spare parts in France. At least four Alpha Jet Es, six Mirage 2000Ds, and three Mirage 2000-5Fs are stored at BA120, BA133, and BA116, respectively. Additionally, the Patrouille de France (PAF) aerobatic display team, based at BA701 Salon de Provence, has access to an unknown number of Alpha Jet Es, which are kept for spare parts or as reserves for future use by the team.



Left: ***Mirage F1Cs and Jaguar As of the French Air Force in the process of being scrapped at BA279 in 2012*** *Claude Archamboult*



Middle left: ***Taken in March 2021, this image shows a partially disassembled Mirage 2000C, 101/'115-KE' which was later scrapped and behind it a Mirage 2000B, '521', which was sold to India*** *Phil Auger*



Below left: ***BA279 turned into the biggest scrapyard for the FASF's Mirage 2000N nuclear strike fighters, including this example 341/'116-BF' which was one of the very first examples to be scrapped there*** *Claude Archamboult*

Mirage 2000B two-seat combat trainers (521 and 522).

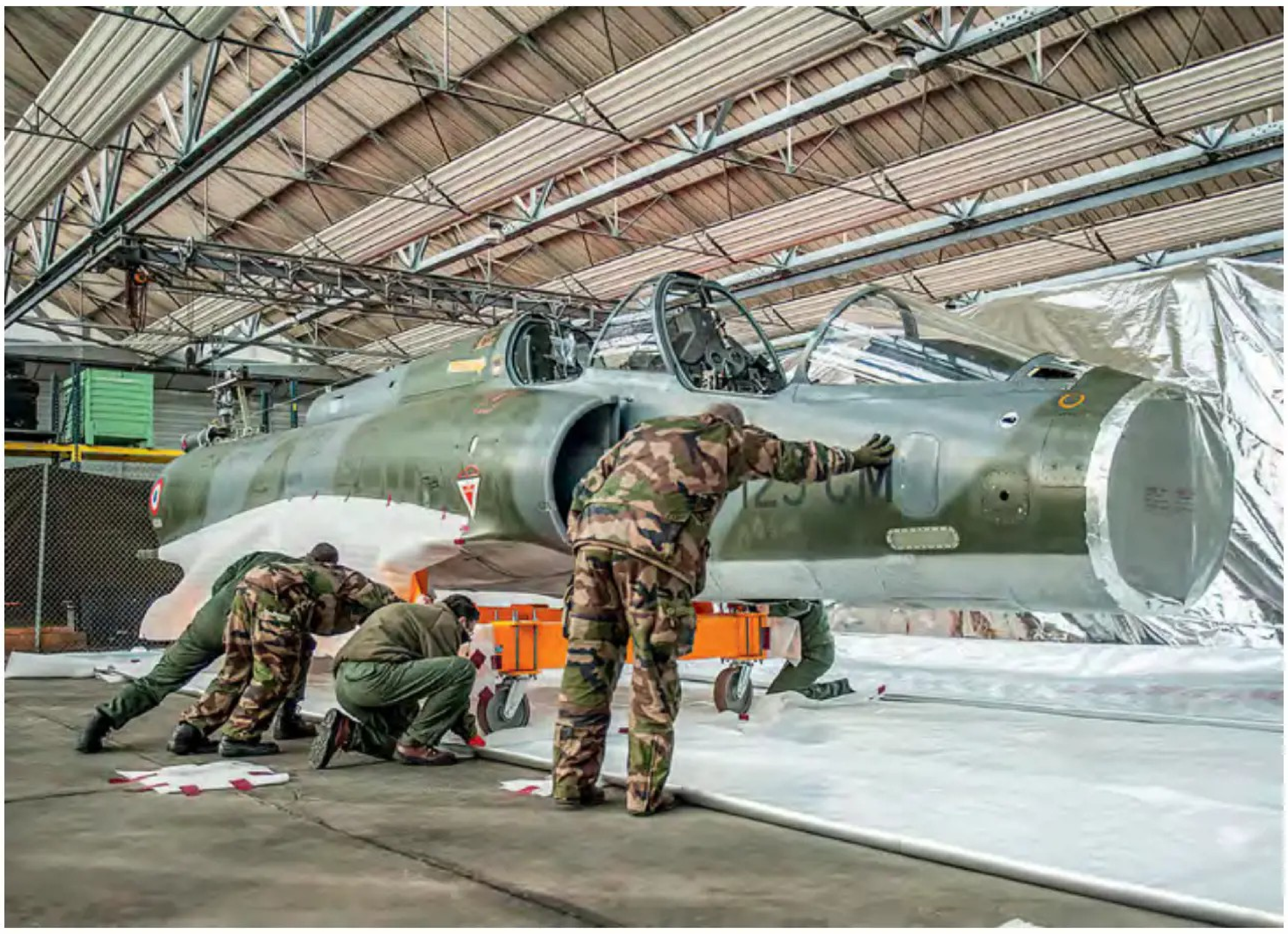
Of the 24 aircraft ordered by the Indian government for the Indian Air Force (IAF), 13 were delivered in operational condition, with both airframe and engine intact, and eight were ready to fly after servicing. The remaining 11 aircraft, though partially complete, included key components such as fuel tanks and ejection seats, which were intended to be used as spare parts for the IAF's fleet of Mirage 2000H/TH aircraft undergoing modernisation. Of these, 21 aircraft were stored in the humidity-controlled hangars of the air base. Most were shipped to India in crates from the airfield in 2021, while a few that had been transferred to Procor hangars in 2020 were shipped to India from Luxeuil.

Relocation of Mirage 2000Ns and Alpha Jet Es

Except for one aircraft (337/'116-BF'), which was preserved at the CANOPEE (Conservatoire d'Aéronefs non Opérationnels Préservés et Exposés) museum in Châteaudun, 30 Mirage 2000Ns, including three severely damaged examples, were scrapped at BA279. The Mirage 2000N on display at the CANOPEE museum was not the only survivor. Between June 2020 and March 2021, the GERSA 11/611 dismantled and relocated seven Mirage 2000Ns and five Alpha Jet Es from the temperature and humidity-controlled hangars at BA279 to BA278 in Ambérieu-en-Bugey. These aircraft were preserved in a state conducive to future restoration for potential FASF use.

Of the seven Mirage 2000Ns (serials 358/125-BQ, 370/125-CQ, 371/125-BD, 372/125-CM, 373/125-CF, 374/125-BS, and 375/125-CL), six were scrapped, with their salvageable parts transferred to the Service Industriel de l'Aéronautique (SIAé) at Clermont-Ferrand by the end of 2024. A further Mirage 2000N (344/4-BV) was moved to BA278 prior to these aircraft and had its fuselage preserved until January 2025, when it was transferred to the Montélimar aviation museum (Musée Européen de l'Aviation de Chasse).

All Mirage 2000Ns and Alpha Jet Es stored at BA278 were wrapped in Controlled Hygrometry Covers (HHC). These covers, made of heat-sealable canvas, maintain a dry environment with humidity levels below 40% by utilising desiccant bags. This low-cost preservation method prevents corrosion and mould, while the opacity of the covers also shields the aircraft from ultraviolet damage. The preservation system ensures that the aircraft remain in a condition as close to their original state as possible.



Above: ***When Mirage 2000N-K3 nuclear strike fighter 272/'125-CM' was retired in July 2018, it still had a lot of flying hours left prior to the end of its life. It became one of the seven examples that FASF decided to save and send to BA278 when BA279 was closed. It can be seen during the preparations for shipment at Châteaudun on November 22, 2020*** *French Air Force/Adj Nicolas VISSAC*

Below: ***Retired in December 2017, Mirage 2000N-K3 nuclear strike fighter, 374/'125-BS' was saved by the FASF from getting scrapped in 2021. It was shipped from BA279 to BA278 and was there for several years until its last parts were scrapped last year*** *French Air Force/Maureen Canvel*

The five Alpha Jet Es, including 'E13/8-MM' stored at BA278, were subsequently relocated to other bases, including BA120 Cazaux. Their parts are used to sustain the FASF's remaining operational Alpha Jet Es which are utilised by Escadron d'Entraînement 3/8 (Training Squadron 3/8) 'Côte d'Or', for adversary and red air training during FASF exercises. These aircraft also played a crucial role in training 26 Ukrainian Air Force fighter pilots.

Preserving the legacy of BA279

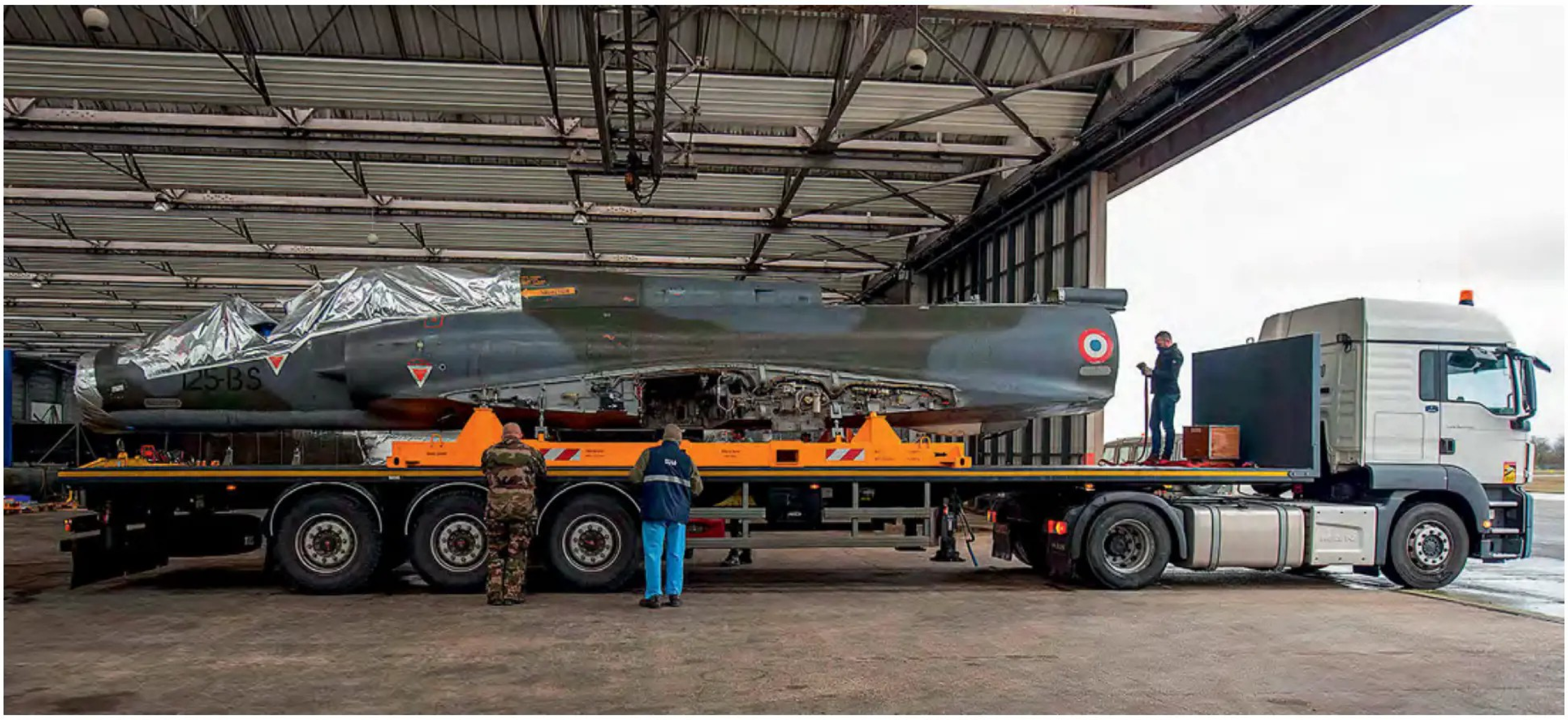
The CANOPEE Museum, located at Châteaudun, was established following an order issued by the former commander of BA279, Col Eric Law de Lauriston de Boubers, in 2004. He requested Major Jean-Michel Wuillemain, a unit commander in the base, to carry it out. Today, the museum houses approximately 50 aircraft, the majority of which are on display, with the remainder either undergoing or awaiting restoration. In addition to the aircraft, the museum features various environmental equipment, engines, radars, and an extensive array of aircraft maintenance and servicing tools.

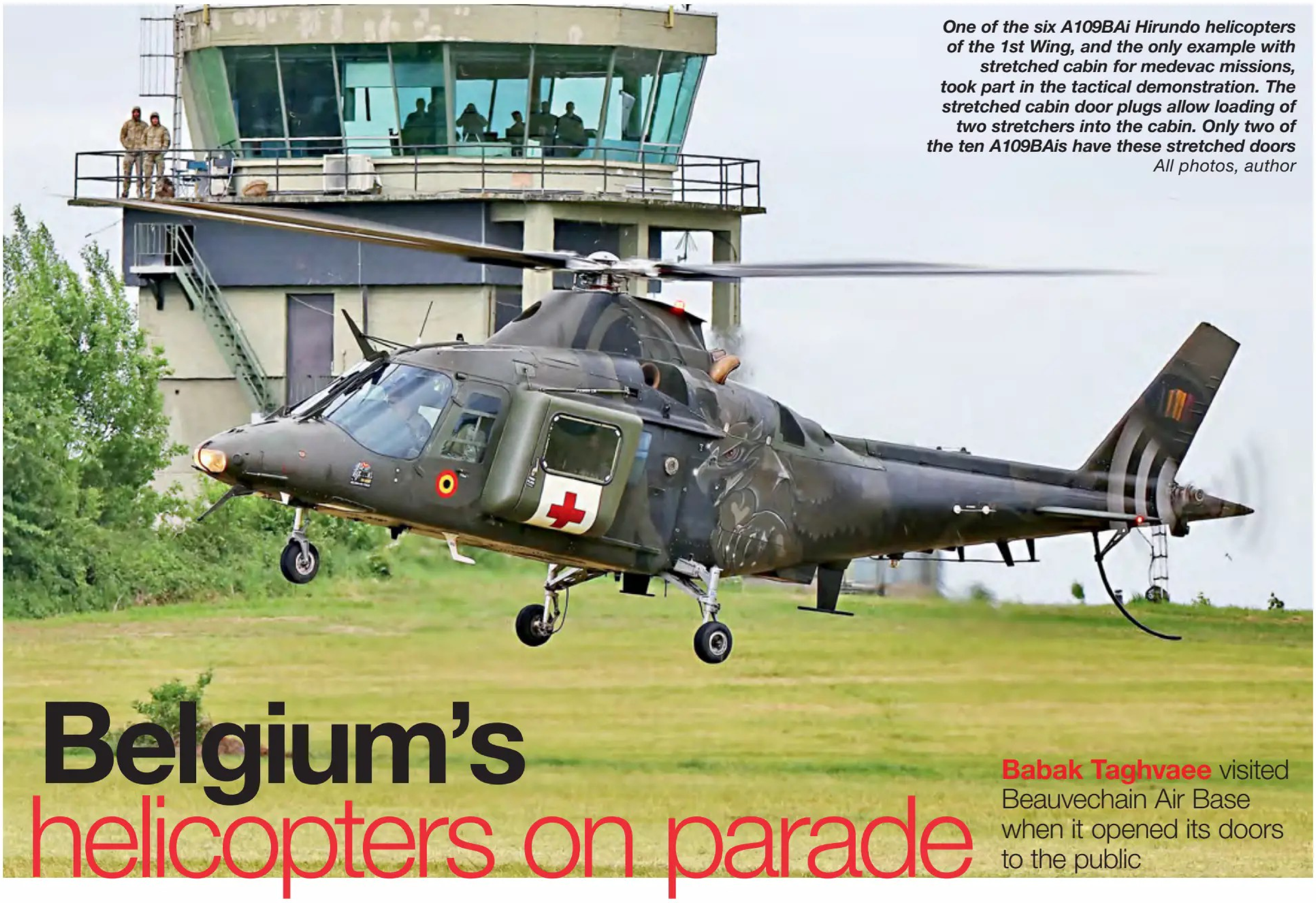
The founders of the museum made significant efforts to preserve the first example of every fighter aircraft that served in the French Air Force (FAF) and FASF after World War Two, or, where possible, the last examples in operational service. By 2018, when the fate of BA279 was determined, the museum had already acquired 43 aircraft and helicopters. Between 2018 and 2023, Wuillemain and the museum's team successfully preserved several more aircraft that would otherwise have been scrapped.

These included a Jaguar A (A91), a Mirage IIIE (524), a Mirage F1CR (602), a Mirage 2000N-K3 (337/116-BF), a C-160R NG Transall (R203/64-GC), and a C-160G Gabriel (F221/G02-GS). The Jaguar A, which had been stored at BA279 since 1994 and used for spare parts, had sustained significant damage after being hit by an Iraqi surface-to-air missile during Operation Desert Storm on January 17, 1991. The cost of returning the aircraft to service was deemed prohibitive.

The C-160R tactical transport aircraft and the C-160G signal intelligence (SIGINT) aircraft arrived at Châteaudun following the closure of BA279 in 2021. The C-160R was withdrawn from service and arrived on July 15, 2022, while the C-160G followed in January 2022. After their arrival, their Rolls-Royce RTy.20 Tyne Mk 22 turboprop engines were removed and transferred to the French Navy Aviation for use on its Atlantic 2 maritime patrol aircraft.

BA279's closure on July 21, 2021, followed the disbandment of EAA 601 and GERSA 11/601. Prior to the closure, most of the aircraft left behind at the base were scrapped, with some parts repurposed as souvenirs or office furniture by local businesses. The closure of the base, along with its warehouse and maintenance facilities, marked the end of centralised aircraft storage and regeneration within the air force. Since then, the FASF has relocated its decommissioned and reserve aircraft to several other air bases across France, such as BA120 Cazaux and BA125 Istres-Le Tubé, located in the southwest and southeast, respectively. **afm**





One of the six A109BAi Hirundo helicopters of the 1st Wing, and the only example with stretched cabin for medevac missions, took part in the tactical demonstration. The stretched cabin door plugs allow loading of two stretchers into the cabin. Only two of the ten A109BAis have these stretched doors
All photos, author

Belgium's helicopters on parade

Babak Taghvaee visited Beauvechain Air Base when it opened its doors to the public

Home to the flight training organisation Competence Center Air (CC Air), as well as the 1st Wing of the Belgian Air Component, Beauvechain Air Base staged an open day on May 7, featuring both static and dynamic displays of gliders, fixed-wing aircraft and helicopters. Assets from other units of the Belgian Air Component (BAC) were also flown in and display flights and tactical demonstrations were conducted throughout, offering visitors a rare opportunity to observe operational capabilities up close.

The BAC is being redesignated the Belgian Air Force from July 21 this year, during Belgium's National Day.

Local assets on display

Headquartered at Beauvechain, the 1st Wing operates the majority of Belgium's military helicopter fleet. Its 17th Multirole Helicopter (MRH) Squadron and 15th Training Squadron collectively operate ten Agusta A109BAi Improved Hirundo light utility helicopters – remnants of the original 46 A109BAs acquired by the Belgian Army between 1992 and 1994. Modernised to the A109BAi standard in 2003, these helicopters have been adapted for utility roles, with their BGM-71 TOW anti-tank missile target sight units (TSUs) removed.

There were two A400Ms of the Belgian Air Component's 20 Squadron flying at the open day event, their crews showing tactical take-offs and landings at the base

Six of the A109BAi helicopters were featured during the event – two (H-29 and H-38) in static display and four (H-21, H-24, H-27 and H-46) in flight demonstrations. Of particular note, H-46, painted in a digital camouflage scheme, conducted an aerial insertion of the Black Devils parachute display team. The remaining three helicopters supported a tactical demonstration by Belgian Army Special Operations Forces (SOF), including H-24, which was equipped with a medical evacuation (medevac) kit. This configuration included enlarged main doors to accommodate stretchers for the transport of wounded personnel.

The 18th MRH Squadron, also part of the 1st Wing, deployed one of its four NHIndustries NH90 tactical transport helicopters (NH90-TTH), tail number RN07. It supported a live demonstration involving SOF personnel performing fast-roping, troop insertion and external cargo sling-load operations. In addition, an NH90 NATO frigate helicopter (NH90-NFH), tail number RN-04, from the 40th Squadron based at Koksijde Air Base (AB), executed a dynamic flight display, showcasing maritime search and rescue (SAR) capabilities.

CC Air, the BAC's flight training organisation, displayed several of its SIAI-Marchetti SF.260D/M+ light trainers, which are used for basic flight training with the Belgian Air Cadets. The aircraft presented belonged to the Red Devils aerobatic team, with four examples (ST-18, ST-20, ST-23 and ST-36) participating in aerial displays and one (ST-35) positioned for static exhibition. Notably absent were the grey-liveried SF.260s operated by the 5th and 9th Squadrons of CC Air.

Beauvechain AB also houses the BAC's Air Cadets Centre, which continues to operate four Piper L-21B Super Cubs originally acquired from the Royal Netherlands Air Force in

One of only four NH90-TTHs of the BAC (BN-07) during the tactical display at the event. The Belgian media published reports a day before the event claiming that these all will be retired from service due to their high maintenance costs and low availability in 2025

1975. These legacy aircraft are primarily used for glider-towing operations involving the Glaser-Dirks DG-505 sailplanes. During the open house event, two L-21Bs were presented: LB-02 in static display and LB-03, which towed a DG-505 glider (PL42) in a dynamic demonstration.

Colonel David Dupuis, commander of Beauvechain AB, shared his insights with the author during the event: "We have organised an open door event, which is conceptually distinct from a traditional airshow. Our objective is to highlight the operational capabilities of our base rather than entertain with large-scale aerial demonstrations.

"Each participating unit, from training squadrons to operational elements, is showcasing its specific mission set and assets. As of the morning of May 7, we had sold 5,000 tickets [€9.59 each], and we anticipate attendance to surpass 8,000 visitors by the end of the day. The highlight of the event – symbolic of our future transition – is the H145M of the Luxembourg Police. Fifteen of these aircraft have been ordered to replace our A109 fleet between 2025 and 2026, so it is significant to present one during this event."

Visiting aircraft

Forming a prominent feature of the static display, not surprisingly, were BAC training aircraft. However, there were also visiting exhibits: a French Army EC120B Colibri (F-HMVM/M) and a French Air and Space Force Embraer EMB-121 Xingu (082/YG). They were invited because they serve as training platforms for BAC helicopter and transport aircraft pilots undergoing instruction in France. Historic aircraft with BAC lineage also appeared, including a privately owned Supermarine Spitfire LF.XVI (OO-XVI/SL721) and a Britten-Norman BN-2A-21 Islander (OO-MMM), currently operated by the Belgian Coast Guard and formerly flown by the Belgian Air Force until its retirement in 2005.

Despite overcast conditions in the morning, several non-local aircraft and helicopters performed dynamic displays. These included a pair of MD Helicopters MD-902 Explorers (G-10 and G-12) operated by the Belgian Federal Police. G-10, featuring a special livery, participated in three live tactical demonstrations involving SOF troops, while G-12 conducted low-altitude passes over the airfield. Both helicopters were temporarily deployed to Beauvechain AB for the event.

Additional guest helicopters included a H145M of the Luxembourg Police and an Aerospatiale SE-313B Alouette II (F-AYTG) formerly operated by the French Army, now in civilian hands. Both were presented in the static display. Other aerial shows included three F-16AMs from the 2nd Wing at Florennes AB (FA86, FA91, FA92), one F-16BM from the 10th Wing at Kleine Brogel AB (FB24), two Airbus A400M Atlas tactical transport aircraft (CT03 and CT08) from the 20th Squadron, 15th Wing at Brussels-Melsbroek AB, and a NATO multinational MRTT unit Airbus A330-243MRTT (T-054), which overflew the event while en route from Cologne to Eindhoven on a training mission.

The open day concluded at 1700hrs local time, with guest aircraft and helicopters promptly returning to their home bases. It is likely to mark the final public appearance of the A109BAi and NH90-TTH helicopters of the 1st Wing at their home station prior to their retirement, as the BAC transitions to the Airbus H145M. According to Col Dupuis, surplus proceeds from the event will be donated to several charitable organisations, including those supporting the families of military aviation accident victims. **afm**

According to the Beauvechain AB commander, Colonel David Dupuis, an Agusta A109BA pilot, the highlight of the event was this H145M of Luxembourg police – a representative of the 1st Wing's future as the unit is receiving 15 of them, replacing its ten ageing A109BAis in 2025 and 2026.

Catching the venerable Warthog in South Korea was on top of the wish-list of every enthusiast that travelled to Osan. That wish luckily came true with the last landing on Sunday afternoon. All photos, author

Say hello wave goodbye

Andreas Zeitler flew all the way to South Korea to catch the A-10A Warthogs there before they headed home later this year.

In May 2025, Osan Air Base in South Korea opened its gates to the public for the much-anticipated Osan Air Power Days. Taking place on May 10 and 11, the event marked the return of the air show after a six-year pause. For the local community this was an aviation spectacle that brought together military power, cultural exchange, and international partnership. For the aviation enthusiast, it was a last opportunity to see the A-10C Thunderbolt IIs of the 25th Fighter Squadron “Assam Draggins“ that are set to leave the Korean Peninsula this year. Featuring an array of aerial demonstrations and static displays from both the United States Air Force (USAF) and the Republic of Korea Air Force (RoKAF), this year’s edition emphasised the strength and unity of the US–ROK alliance under the theme “Respect the Past, Forge the Future.”

The Heart of the Show: Osan’s Resident aircraft

Osan Air Base, located roughly 40 miles south of Seoul, is one of two major airfields operated by the USAF in the Republic of Korea and home to the 51st Fighter Wing, whose current aircraft inventory includes the A-10C and F-16C/D. During the show, the base highlighted its own capabilities by featuring a selection of aircraft permanently stationed at Osan.

Among the most prominent in the line-up were the F-16C Fighting Falcons of the 36th Fighter Squadron “The Flying Fiends“. Two of the unit’s jets were parked nicely along the flight line and were used by Pacific Air Forces (PACAF) F-16 Demonstration Team. The team is based at Misawa Air Base, Japan, but making use of Osan’s jets, Capt Ethan “Bantam“ Smith was able to avoid ferrying two aircraft to South Korea. In the static display the “Flying Fiends“ also presented an F-16C (89-0043), still wearing the special markings it wore in 2017 to celebrate the Squadron’s 100th anniversary.

One A-10C Thunderbolt II, operated by the 25th Fighter Squadron, was on full display together with its signature GAU-8 Avenger rotary cannon and heavy armour. With the impending decommissioning of the 25th FS. the aircraft on display (81-0979) showed a splendid scheme that reminisced the Squadron’s rich history with the six insignias it has worn since 1941. They were placed inside the black and yellow fuselage band, which was typical for early US fighter jets being stationed in South Korea. Twice a day there was an armouring and weapon loading demonstration given of a 2000lb inert GBU-31 V3 bomb on a Warthog.

For the aerial display, two of Osan’s A-10s demonstrated the type’s precision targeting capabilities in a simulated ground attack demonstration. The two-ship formation was led by the 25th Fighter Squadron commander Lt Col Justin Davis, who emphasised the Assam Draggins special role, when he said, “‘The A-10 has a significant history supporting the defense of many nations, the 25th Fighter Squadron was uniquely focused on missions specific to Korea.: It was a very special moment for him to fly the jet in front of the South Korean public for a

As one of presumably currently three based U-2S at Osan, S/N 80-0077 was put on public display. Being assigned to the 5th Reconnaissance Squadron, it are the Blackcats on the tail, and just being closely roped off, it presented a rare chance to actually touch the Dragon Lady.

last time, as he said later: “We have a very deep passion and pride in the mission of defending South Korea and are very proud to have served alongside our ROKAF counterparts so long. We look forward to showing everyone the close support mission of the A-10 and the mission it has been supporting for decades“.

Last but not least was another unique presence from Osan was the U-2S Dragon Lady (80-1077), flown by the 5th Reconnaissance Squadron “Blackcats“. The Squadron is part of the 9th Reconnaissance Wing at Beale AFB, California and operates the Dragon Lady for strategic intelligence-gathering missions across the Pacific region. While the U-2 was originally announced to take part in the flying displays as well, it unfortunately dropped out from the list. Still, its presence on the static ramp drew interest due to its rarity and unique mission profile, even though seeing it in the air would have been amongst the highlights of the day.

Visiting Aircraft

Another major draw of the Osan Air Power Days was the opportunity to see South Korean aircraft as well as those not normally based in Korea. Several aircraft from the PACAF and ROKAF units participated as static displays, and a flight demonstration was given by the Black Eagles, ROKAF’s elite aerobatic team flying the KAI T-50B Golden Eagle. Their white, red, and blue smoke trails created a good spotlight in the otherwise hazy spring skies above Osan.

In addition to the Black Eagles, the ROKAF brought a variety of frontline and support aircraft, showing a very comprehensive overview of their major fast jet assets. The display included the FA-50 Golden Eagle (16-0056), a light combat version of the T-50, and the KA-1 Woongbi (06-0015), used for light attack and forward air control. Heavier hitters such as the KF-5F Tiger II (10-0594), KF-16 Fighting Falcon (92-0006), F-15K Slam Eagle (02-0019), and the F-35A Lightning II (20-0018) also made appearances on static display. The C-130H-30 Hercules (55-0030) and CN 235 (30-0082) transport aircraft, used for strategic and tactical airlift missions, highlighted the logistical backbone of the air force.

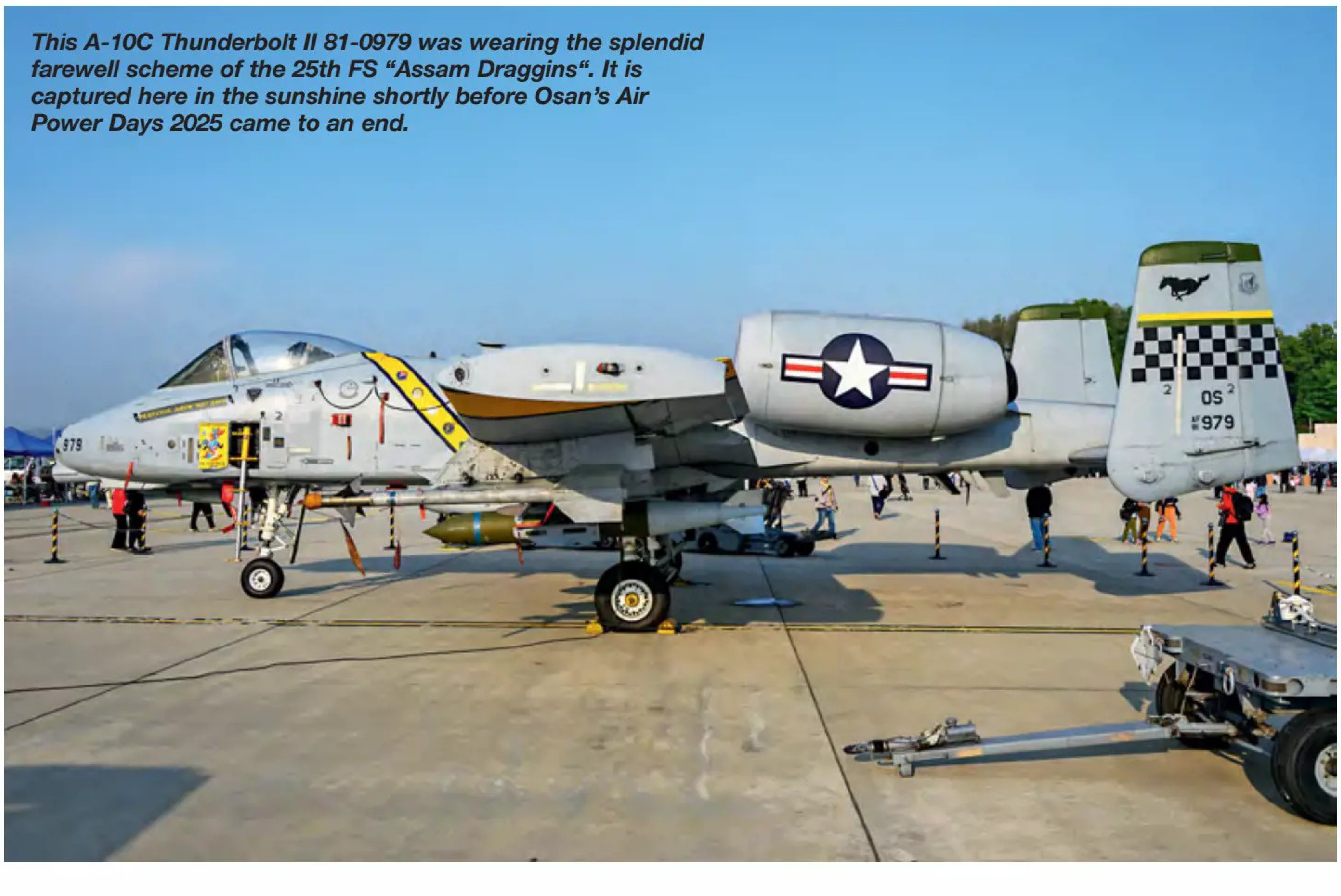
As an extra to the PACAF F-16 Viper Demonstration Team, a USMC F-35B Lightning II of VMFA-214 “Black Sheep“ performed a capability demonstration showing the jet’s short take-off and vertical landing (STOVL) capabilities. In addition to the flying demonstration, the squadron brought their boss bird, F-35B (BuNo 170053) over from Iwakuni, Japan. A further spotlight was US Navy V-22 Osprey 169456 of VRM-30, currently based on board USS George Washington (CVN-73). Complementing its high visibility scheme, the Osprey’s special painted tail featured a Japan-inspired tail art showing the sunrise behind Mt Fuji. Another essential element of the US Navy is maritime patrol, and this was showcased by a P-8A Poseidon (169004) of Patrol Squadron VP-9 ‘Golden Eagles’. It flew in from Japan just as the C-130J Hercules (08-0177) did, from Yokota Air Base.

The ROKAF Black Eagles flying the T-50B Golden Eagle lit up the flying display at the Osan Air Power Days 2025 with their spectacular display routine. They were the only ROKAF aircraft flying during the show.

Finally, it should not be left unmentioned that Saturday was unfortunately a complete washout for the show. Heavy rain and cold winds caused the entire flight program to be cancelled, meaning very few visitors made their way to Osan. Sunday was much better, although the flight program remained rather limited and unfortunately fell short of previous years.

However, it was the last opportunity to say goodbye to the A-10s in Korea, and 25th FS crews, even though being wistful about completing their final flight hours on the Warthog over South Korea in the coming months, made the best out of it to showcase their Warthogs to the public.

Together with the extensive static display this made up for the lack of action in the air, as did the sunshine on Sunday evening. And where else but in South Korea can you end a relaxing airshow day with the sounds of a K-pop band on the show stage, American pizza and hot dogs?! **afm**


This A-10C Thunderbolt II 81-0979 was wearing the splendid farewell scheme of the 25th FS “Assam Draggins“. It is captured here in the sunshine shortly before Osan’s Air Power Days 2025 came to an end.

Celebrating 2025

Alan Warnes visited Caslav Air Base Open Day on May 17, when the base celebrated '2025' – 20 years of Gripen service, 25 of L-159s

Airshows at Caslav Air Base in Czechia happen every other year normally, and are always well attended by the local community. As the Base Commander, Brig Gen Jaroslav Tomaňa explained: "It provides an opportunity to thank the public for their tolerance while showing them what we do."

Trains were laid on for the event from Caslav town, about five miles away. The eight or so trips the locomotive ran, with its five carriages, reduced congestion on the narrow roads through the nearby village of Chotusice. With 800 passengers on each train, it kept a lot of cars away from the base.

The charge for parking outside the 'new' gate, where there is a preserved MiG-21MF 4008, inscribed '1961-2005', is 250 Cz Kc (£9) and you can cram as many people as you want in a car – and they did! It was very affordable compared to the likes of UK airshows – not that the RAF actually holds any at a flying base.

The gate opened at 8am and there were plenty of people already there. It's estimated around 50,000 were eventually in attendance.

The show was celebrating the 20th anniversary of the Gripen in service, and the 25th of the L-159. Many of the base personnel could be seen wearing a tactical patch to mark the occasion – referred to as '2025'. Both aircraft played a part in the flying and static displays.

Residents

There are three main flying squadrons at Caslav, home to the 21 Zakladna Taktickeho Letectva (zTL – Tactical Air Force Base) 'Zvolenska'. No 211 Taktcka Letka (TL – Tactical Squadron) flies 14 supersonic Saab JAS 39 Gripen C/Ds, operational since 2005, while 212 TL and 213 Vycvikova Letka (VL – Training Squadron) are now operating 24 Aero L-159s, first introduced into service in 2000. They include 16 single-seaters plus eight T1+ and T2 trainers, with 213 VL focusing on flying training.

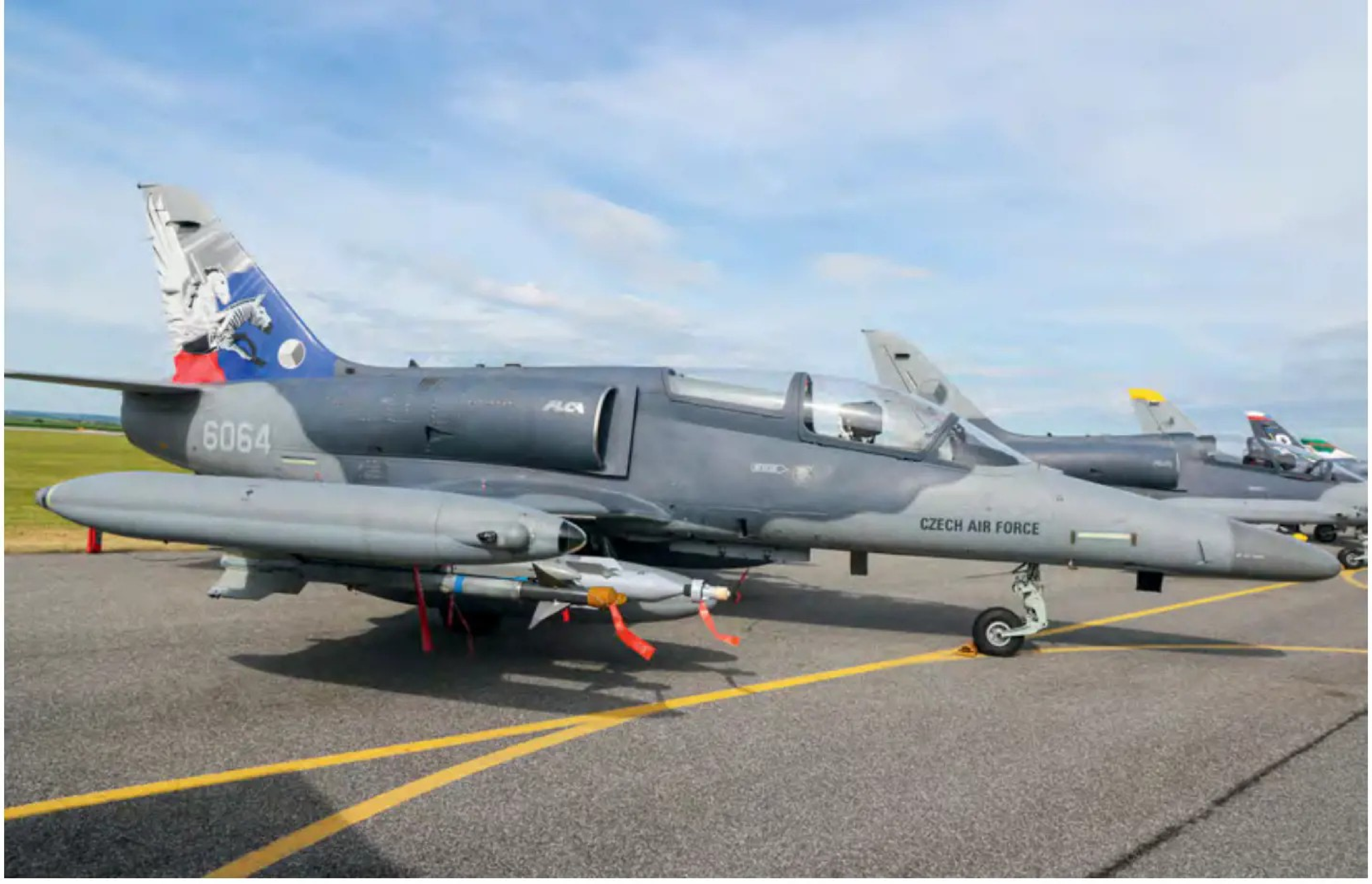
New Czech Air Force Gripen display pilot, Capt Jan Ratz (left), made his public debut at the Caslav show. He replaces Capt Ondrej Spanko (right), who had been doing the job since 2021

A fourth unit, 214 Letka Oprav Letecke Techniky (LOLT – Maintenance Squadron) caters for the upkeep of the L-159s. Maintenance of the Gripens is the responsibility of 211 TL.

All three flying units had aircraft on show in the static display; a JAS 39D Gripen 9820 was fitted with an AIM-9M Sidewinder, 500lb GBU-12 Mk 82 laser guided bomb, AIM-120 AMRAAM and Litening IV targeting pod. Next to it on the ground was the jet's Mauser Bk27 cannon with rounds of bullets arranged to show 211. A single-

Main: **This UH-1Y Venom was used in the tactical display to drop off troops and then pick them up while the AH-1Z Viper was covering them. There was a lot of bangs and flashes during the demo. Eight UH-1Ys and four AH-1Zs have been delivered to the CzAF** All photos, author

Inset: **Many base personnel wore '2025' badges on their sleeves to mark the 20th anniversary of the Gripen and 25th anniversary of the L-159 in Czech Air Force service (see PHOTO of badge)**



Specially marked L-159 6064 wore the Pegasus of 212 TL and striped hippo of 213 VL. The L-159 is celebrating its 25th anniversary serving the CzAF

seat L-159 6064 was parked next to it, with a specially marked tail depicting both the L-159 squadron emblems; the Pegasus winged horse represented 212 and the Zebra was 213 over a Czech flag. The jet was fitted with a GBU-12 and AIM-9M Sidewinder, while dual seater L-159T1+ was fitted with an AIM-9M and SUU-5003 rocket launcher. No 214 LOLT showed off L-159T1+ 6077 disassembled in one of the old Cold War shelters, and another L-159, 6063 was seen sheltered with all its weaponry on show, including the Plamen PL-20 cannon, CRV-7 rocket pods and BDU-33 practice bombs.

Interesting visitors

Although the static display was comprised mainly of Czech Air Force (CzAF) aircraft, including a CLV (Centrum leteckého výcviku – Flight Training Centre) LET 410UVP, serial no 0928, a 222 Vrtulnikove Letky (VL– Helicopter Squadron) Mi171Sh 9825, there was a 31 Squadron/Belgian Air Force F-16B FB-24 with 'Semper Vulture' painted on the tail base, and a German Air Force Eurofighter of TLwG 74 'Bavarian Tigers' based at Neuberg. Beyond the resident Gripen and L-159s, was a CLV L-39C, its days numbered now the first two L-39NG Skyfoxes have been delivered, with one on show next to it. Three nicely preserved fighters from the base's collection were positioned at the end of the static line – MiG-15bisSB, MiG-21MA and Su-7BM

In a rather fetching new colour scheme, Aero's L-159T2X demonstrator, 6073, was seen in a separate flightline/static area, parked close to an CzAF C295W, AH-1F Cobra warbird and a Slovak Air Force UH-60M Blackhawk.

Unfortunately, by the time the flying display started at 11am, the skies had clouded over but there were some interesting flying formations, two CzAF Gripens and a C295M, as well as an Aero Vodochody formation made up of a L-29, L-39C and three L-159s. For many, the Swedish Historic Flight with its Saab J-32 Lansen and dual-seat Saab SK37D Viggen, would have been the stars, making solo displays and then flying in formation with a based Saab Gripen. The CzAF's new display pilot, Capt Jan Ratz, who has replaced Capt Ondrej Spanko, made his public debut at the show, flying earlier in the display programme and again with the Saab Historic Flight.

For the author, the stars of the show were the relatively new Bell UH-1Y Venom and AH-1Z Viper attack helicopters that have helped replace the role of some Mi-17 *Hips* and the iconic Mi-24V *Hinds*. Parked on the grass in front of the crowd line, they attracted a lot of attention, well positioned for a quick getaway for their flying display. The US helicopters, flown by 221 VL from Namest nad Oslavou, in the southeast of Czechia, provided onlookers with an opportunity to witness one of their key roles – offloading and loading troops, perhaps to recover a downed pilot or an injured soldier. An impressive ten-minute tactical display saw both fly a couple of formations over the runway, before the UH-1Y landed to drop off some troops for a mission that saw them being covered by the AH-1Z – then they did it again in reverse. It involved a lot of flashes and bangs when a simulated attack of the base took place.

As soon as the show had ended at 4pm, everyone started heading for the exits and by 5pm when the show ended, the ground was empty! That would never happen in the UK. **afm**

The veteran Soviet 2K12 KUB (NATO code name SA-6 Gainful) system still serves the CzAF at Strakonice with the 25th Protiletadovly Reaketovy Pluk (Anti-aircraft Rocket Regiment) 'Tobrucky'. They should be retired next year when the Rafael Spyder short-range air defence batteries replace them

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Six killed in Sri Lankan Bell 212 crash

AFTER TAKING off from Hingurakgoda Air Base at approximately 0645hrs local time on May 9, Sri Lankan Air Force/7 Helicopter Squadron Bell 212 SUH-566 encountered a technical problem and crashed into the Maduru Oya Reservoir while attempting an emergency landing at approximately 0817hrs.

Although all 12 on board (six from the Army and six from the SLAF) were rescued, six were hospitalised in critical condition at the Polonnaruwa Hospital. Of these, five were pronounced dead after arriving at the hospital, while the sixth succumbed to his injuries the following morning. The deceased included four Army Special Forces (SF) personnel and two SLAF Helicopter Gunners.

The wreckage of Sri Lankan Air Force Bell 212 SUH-566 being recovered from the Maduru Oya Reservoir on May 10, the day after its crash *Via Twitter*

The remaining seven injured survivors, all tri-forces personnel, also received treatment in hospital. The accident occurred en route to a Heli-Rappelling demonstration at a Special Forces passing-out ceremony at the Maduru Oya Army Training School. The wreckage of the helicopter was lifted out of the water the following day.

Peruvian KT-1P Woongbi lost

PERUVIAN AIR Force (FAP) KT-1P Woongbi FAP446, operated by the Escuadrón Aéreo 512 de entrenamiento basico, was reported missing at 1608hrs local time on May 20 near Zárate Island during a tactical navigation training sortie from Pisco-San Andrés/Base Aerea Capitán FAP Renan Elias Oliveira. Later that afternoon the FAP announced that some aircraft remains had been spotted on an islet south of Paracas peninsula, between the islands of Zárate and Zaratillo.

On May 24, the FAP said a third fuselage section was found on Supay Beach and on May 25 reported two further fragments of the aircraft had been found North of Mendieta beach. The female pilot, FAP Ashley Stacy Vargas Mendoza, a second lieutenant making her final flight to graduate as a military pilot, was still missing and the search was continuing. The search operation included a C-26B aircraft, Mi-17 and Enstrom F280-FX helicopters, as well as a patrol boat from the Coast Guard.

Crew escape Paraguayan Police Huey crash

WHILE DELIVERING food supplies to cut-off flood victims in Chaco on May 15, Policia Nacional Paraguay UH-1H Iroquois A-15 experienced a mechanical failure at approximately 0935hrs local time and force landed in a plantation near La Fortuna ranch, Alto Paraguay, Chaco, resulting in substantial damage. The five occupants (pilot Inspector Blas Merete, co-pilot Petty Officer Major Miguel Delvalle, navigator Petty Officer Major Néstor Ortellado and two officials of the Government of Alto Paraguay – Virgilio Gavilán and Enrique Enciso) escaped with minor scratches.

The Huey had earlier left Olimpo Airport and had been due to terminate its mission at Florín. An official statement said that a light of the mechanical particle detector chip in the engine had illuminated, following which there was a friction noise and then the engine stopped, forcing the helicopter down.

Pakistan downs at least three Indian fighters

IN THE early hours of May 7, the Indian Air Force (IAF) launched strikes on targets inside Pakistan, in retaliation for a terrorist attack in Kashmir that killed 26. Pakistan claimed to have shot down five IAF aircraft, including three Rafales, but there is only evidence so far of one Rafale loss, a Mirage 2000 and a Su-30MKI.

The Rafale was destroyed when it crashed in harvested wheat fields at Aklian Kalan village, Bathinda district, Punjab, India, at approximately 0200hrs local time, killing a migrant farm labourer on the ground and injuring nine others. The pilot ejected safely and was taken to hospital. An image circulating later on social media showed wreckage of the tail fin of Rafale EH BS001.

Eyewitnesses and photographic evidence of the wreckage, including the nose cone, pylon mounts, MICA missile parts and engine debris, confirmed the downed aircraft as a Rafale. The death and injuries on the ground occurred because local villagers, awoken by the crash, rushed towards the burning wreckage and were then struck by shrapnel and burning debris when ammunition on the aircraft detonated.

A second loss during the same night was an IAF Mirage 2000 reportedly destroyed in a crash near Wuyan, in Indian administered Kashmir. It is also believed to have been shot down by Pakistan. Images posted online showing debris, including a Mirage external fuel tank and accounts of an aircraft on fire in the region, support the likelihood of a shootdown. Just a quarter of a mile from where the fuel tank was found, a video showed flaming wreckage in a primary school which had been hit by a crashing aircraft.

The third loss was an IAF Su-30MKI. A Russian K-36DM ejection seat and the remains of Brahmos missiles, found in the Ramban region of India's Jammu state, appear to confirm the loss, again most likely after being shot down by Pakistan.

Thai Police Bell 212 destroyed in fatal crash

DURING A police training flight on May 24 from Surat Thani Airport to Kanchanaburi, Royal Thai Police/ Kanchanaburi Police Aviation Unit Bell 212 2215 experienced a technical problem and crashed around 1300hrs local time in an open field at Ban Nong Kok village, Ao Noi Subdistrict, Muang District, Prachuap Khiri Khan Province. It was destroyed in a post-crash fire.

Three on board were killed but the fourth crew member was able to parachute out before the crash and survived. The fatalities were identified as Pol Maj Pratheung Chulert, pilot; Pol Capt Songphol Boonchai, pilot and Pol Lt Thinnakrit Suwannoi, flight mechanic.

The still fiercely burning remains of Royal Thai Police 212 2215 after its crash on May 24 *Fire & Rescue Thailand*

Accident Reports

D: Jan 9, 1990
N: US Army/4-1st AVN
T: UH-60A Black Hawk
S: 89-26144

The correct date for the loss of this helicopter is as given above. We originally reported it as having crashed on January 10 and also erroneously as being lost on January 4 (see *Attrition*, April 1990, October 1999 and June 2001). It was destroyed when it struck a ridgeline 300ft (91m) above the Mojave Desert at 1532hrs, 14 miles East of Fort Irwin, killing all four on board.

D: Sep 7, 2013
N: Afghan Air Force/Rotary-Wing Training Squadron
T: MD530F
S: 182

The identity of this helicopter, the loss of which we have previously reported (see *Attrition*, November 2013), is now known, as given above.

D: Apr 25, 2025
N: Royal Thai Police Air Wing
T: Viking DHC-6-400 Twin Otter
S: 36964

Shortly after take-off for a test flight from Hua Hin Airport, Cha-am, Phetchaburi, at 0808hrs local time, the No 2 (starboard) engine failed and the aircraft, callsign ‘RTP964’, spun nose down into the in the Gulf of Thailand opposite the Baby Grande Hua Hin Hotel, 0.1nm east of the airport, broke in two and was destroyed. Five of the six occupants, comprising three pilots, two mechanics and an aircraft engineer on board, were killed. The five victims were identified as pilots Police Colonel Prathan Khiewkham and Pol Lt Col Panthep Maneewachirangkul, along with aircraft engineer Police Lieutenant Thanawat Mekprasert and mechanics Police Lance Corporal Jeerawat Maksakha and Police Sergeant Maj Prawat Pholhongsa. Pilot Police Captain Chaturong Wattanapaisarn, was taken to Hua Hin Hospital but later died from his injuries. Following the crash, the Air Support Division, Border Patrol Police Bureau, Marine Police and Police Aviation Division worked together to retrieve the aircraft wreckage from the sea.

Wreckage of Royal Thai Police Air Wing Viking DHC-6-400 Twin Otter 36964 following its crash on April 25 *191 Emergency Centre*

D: Apr 28
N: Ukrainian Air Force/831st Tactical Aviation Brigade
T: Su-27 *Flanker*

While providing air support in an attempt to repel a Russian UAV attack this aircraft was destroyed when it crashed near Kremenchuk Reservoir on Ukraine’s Dnieper River. The pilot, Kapitan Nikolay Klobnikin, ejected using a Zvezda K-36 ejector seat and was rescued by a combat search and rescue team. He was taken for treatment to a medical facility, where he was reported to be in a stable condition. Air Force Command of the Ukrainian Armed Forces officially acknowledged the loss of the aircraft without specifying the cause, while the next day the Russian Ministry of Defence claimed that Russian Aerospace Forces had shot it down.

D: Apr 28
N: US Navy/VFA-136
T: F/A-18E Super Hornet

While the aircraft carrier USS *Harry S Truman* (CVN 75) was operating in the Red Sea this aircraft, along with a tow tractor, was lost overboard. The F/A-18E was under tow in the hangar bay when the move crew lost control of the aircraft and it fell into the sea. All personnel were accounted for, and one sailor sustained a minor injury. Crew members in the Super Hornet and on the small towing tractor both jumped out before the jet and the tug went into the sea. The injured sailor had been in the pilot’s seat of the aircraft. Initial reports indicate that the carrier was making a hard turn to avoid hostile fire from Houthi rebels at the time and this may have contributed to the accident.

D: Apr 29
N: Colombian Navy/Grupo Aeronaval del Caribe
T: Bell 412EP
S: ARC227

Shortly after take-off from Batallón de Infantería de Marina No 13, Malagana, Bolivar, this helicopter suffered a technical failure and crashed at approximately 0800hrs local time into a nearby lake and was substantially damaged, coming to rest inverted and largely submerged.

One of the four on board, NCO Yordy Steven Carvajal Rodríguez, was killed and the other three (pilot, co-pilot and another NCO) injured. Personnel from the base recovered the four personnel from the helicopter but the NCO died later in hospital.

D: May 2
N: Russian Navy/43 OMShAP
T: Su-30SM

While engaging a Ukrainian attack drone swarm targeting Novorossiysk, the aircraft was destroyed when it was shot down 27nm (50 km) west of Novorossiysk, in the Black Sea, by a Ukrainian anti-aircraft MAGURA V7 AA drone boat equipped with AIM-9 Sidewinder short range IR missiles. Both pilots were able to safely eject and were rescued by a nearby cargo ship. Although Kyrylo Budanov, the Chief of the Main Directorate of Intelligence of Ukraine, claimed that a second aircraft was also shot down, there was no evidence to support the claim.

D: May 2
N: Royal Thai Air Force/6th Wing/601 Squadron
T: C-130H Hercules
S: L.8-9/35 60109

While stationary and performing a routine engine run up at Samui Airport, Surat Thani Province, at approximately 1430hrs local time, the pilot identified a malfunction in the wheel brake system and was unable to maintain control when the aircraft began to move forward. The Hercules veered off the parking area, the port wing leading edge hitting a light pole while the nose hit a sign before coming to rest in bushes. All eight crew members and 54 passengers were safely evacuated from the rear of the aircraft, with no injuries reported. Initial reports indicate that damage was only minor. At the time the C-130 was conducting a planned routine training flight from Don Muang via Trang and Samui then back to Don Muang.

กองทัพอากาศ
ROYAL THAI AIR FORCE

Royal Thai Air Force/601 Squadron C-130H Hercules L.8-9/35 60109 after being damaged on May 2 following brake failure at Samui Airport *via Twitter*

D: May 3
N: South Sudan Air Force
T: Boeing 727-30C
S: AVIONS-1001

After landing at Nyala Airport, Sudan, this aircraft was attacked and destroyed by the Sudanese Army while being unloaded. All 20 on board, comprising two pilots and 18 military advisors from the UAE, were killed. The 727 was reported to be carrying Chinese-made UAVs and other military equipment destined for the Sudanese paramilitary Rapid Support Forces (RSF) and the 18 Emirati officers were to oversee drone, jamming and air defence operations. One of the two pilots killed was South Sudanese,

Attrition Report

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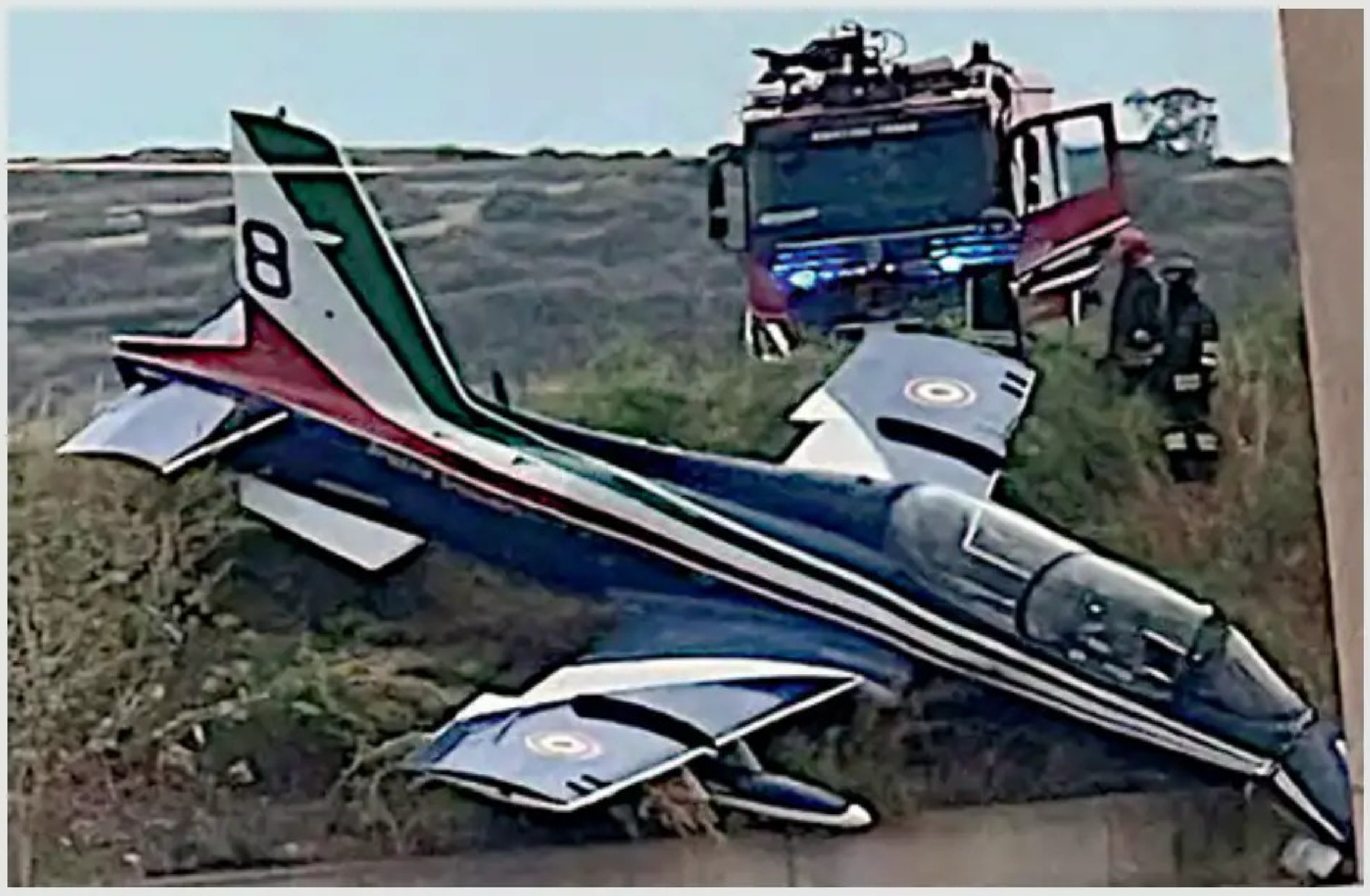


***Italian Air Force/Frecce Tricolori MB.339A/PAN MM54538 '8' after its emergency landing at Pantelleria Airport on May 6 following a mid-air collision with two other members of the team** via Twitter*

Samson Ohide, who was the co-pilot worked for a Kenyan aviation company which was operating the aircraft on behalf of the South Sudanese Air Force to fly supplies to the RSF. The other pilot was an unidentified Kenyan.

D: May 6
N: Italian Air Force/Frecce Tricolori
T: 3 x MB.339A/PAN
S: MM54477 '6' (callsign 'Pony 6'), MM54538 '8' ('Pony 8') and MM55059 '9' ('Pony 9')

While performing a display during the Pantelleria Airshow at Pantelleria Airport these three aircraft were involved in a mid-air collision. All three pilots were able to maintain sufficient control of their aircraft to make safe emergency landings at the airport, although 'Pony 8' veered off the runway due to a nosewheel controllability issue and was substantially damaged. The other two both sustained significant tail fin damage. One of the pilots suffered a suspected leg fracture and was taken to hospital but discharged later, the other two were unhurt.

D> May 6
N: Royal Malaysian Air Force/6 Skn
T: Hawk Mk 208

After bouncing on landing at No 2 Air Base, Alor Setar/Sultan Abdul Halim Airport around 1700hrs local time, the aircraft hit the runway nosewheel first, causing the nosewheel leg to collapse. The aircraft then ran down the runway on its nose before coming to rest. The pilot did not eject and was unhurt. After the nose had been raised, it was positioned on a weapons trailer before the Hawk was towed to a hangar for assessment of the damage. After the runway had been closed for several hours, it finally reopened once the aircraft had been removed. The RMAF said the aircraft had been participating in a training exercise ahead of the opening ceremony for the Langkawi International Maritime and Aerospace Exhibition 2025 (LIMA 25).

D: May 6
N: US Navy/VFA-11
T: F/A-18F Super Hornet

While attempting a night landing on the aircraft carrier USS *Harry S Truman* (CVN-75) at approximately 2100hrs local time during operations in the Red Sea this Super Hornet's arrestor hook failed to catch the arrestor cables and plunged into the sea. Both the pilot and weapon systems operator ejected safely and were recovered with only minor injuries by a helicopter from the carrier. This was the second Super Hornet loss from the carrier within a week after one went overboard on April 28 – see earlier.

D: May 6
N: Yemen Air Force
T: Il-76TD
S: 7O-ADF

This aircraft was destroyed while on the ground during an Israeli air strike by F-15Is and F-16Is on Sana'a - Al-Dailami Air Base/Sana'a International-El Rahaba Airport, which is controlled by Houthi rebels. The Israel Defense Forces said it had attacked runways, aircraft and infrastructure at the airport, alleging the Houthis were using the airport to transfer weapons and operatives. The air strikes were in retaliation for the Houthi ballistic missile attack on Tel Aviv on May 4. Also destroyed during the attack were several civilian aircraft, including Felix Airways CRJ-200ER 7O-FAJ and Yemenia Airways A320-233s 7O-AFA and 7O-AFC, plus A330-202 7O-AFE.

D: May 7
N: Finnish Air Force/Lapland Air Wing
T: F/A-18C Hornet
S: HN-409

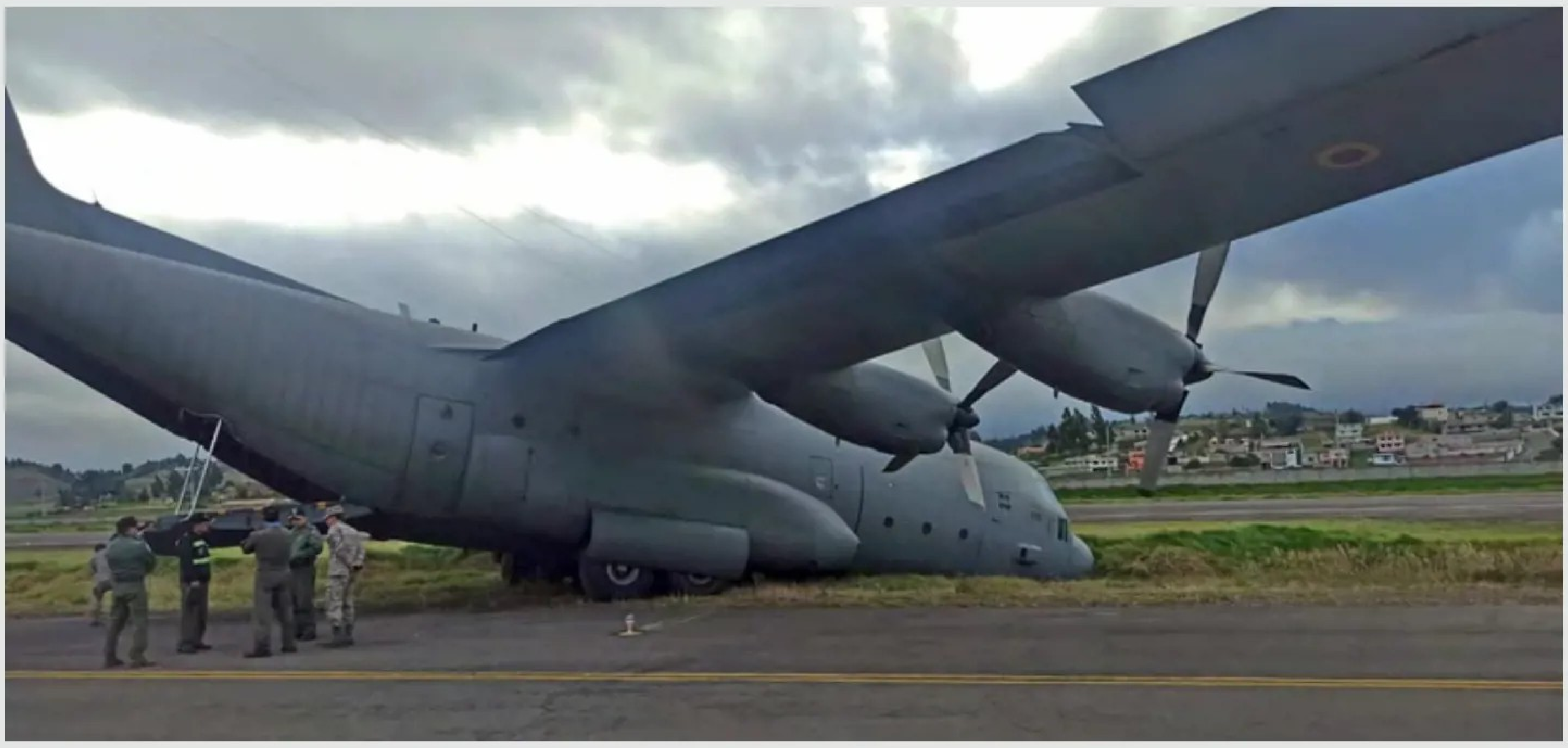
After departing from Rovaniemi Air Base at 1045hrs local time for a local display practice flight, when the pilot trained aerobatic manoeuvres for a Hornet air display, but the aircraft was destroyed when it crashed at 1051hrs. fortunately the pilot ejected safely and was only slightly injured. There were no personnel injuries on the ground. The fighter fell to the ground on the edge of the Rovaniemi runway area, from where it drifted to the LAW F-35 construction site's corner which had no buildings or people. Both Lapland Air Wing and Finavia rescue units arrived soon after the crash to the accident scene. The fuselage was on fire when the rescuers arrived. Fire extinguishing measures began immediately. The pilot parachuted to the airfield and walked into the LAW rescue vehicle without assistance. Air Force medical staff checked him over and an ambulance transferred him to Lapland Central Hospital where he was treated for minor injuries and released. The burning wreckage of the aircraft was effectively extinguished. Military and local police cordoned off the accident site. Rovaniemi Airport was not closed. The Lentokentäntie road was closed for a short while to ensure free flow of rescue traffic. Finavia stated the accident had no effect on the operations or passenger travel at the airport. No major damage was incurred at the Air Wing's construction site and the accident will not impact the continuation of construction work. However, the accident destroyed Rovaniemi Airport's VOR/DME beacon.

D: May 9
N: Pakistan Army
T: EMT Luna X-2000
S: 045

This UAV was discovered with its recovery parachute deployed by a farmer in a field near Wagah in Pakistan's Lahore District. It appeared to have sustained only minor damage. The location was close to the Indian border and it is possible that it was downed by Indian electronic warfare, but this is only speculation.

D: May 13
N: Ecuador Air Force/ Ala de Transporte 11/Escuadrón de Transporte 1111
T: C-130H Hercules
S: FAE-898

While preparing for take-off at Latacunga-Cotopaxi International Airport for a proposed flight



***Ecuador Air Force C-130H Hercules FAE-898 at Latacunga-Cotopaxi International Airport on May 13 after it ran off the tarmac into a ditch** via Twitter*

Bolivian Air Force Cessna 210L Centurion FAB-354 after the nose undercarriage collapsed on landing at Riberalta-Capitán Av Selin Zeitun Lopez Airport on May 16 *via Twitter*

to Guayaquil-José Joaquín de Olmedo International Airport, the aircraft veered off the tarmac and came to rest nose-down in a ditch. No injuries were reported and the aircraft did not appear to have sustained any serious damage. It is believed that during start-up the brakes appeared to have failed and the crew were unable to stop it from moving forward.

D: May 13
B: Turkish Navy
T: S-70B-8 Seahawk
S: TCB-62

This helicopter made an emergency ditching at sea off the coast of Antalya due to a technical malfunction while participating in Exercise DENİZKURDU-II/2025. The four personnel on board were recovered safely but were transferred to hospital for check-ups as a precautionary measure. The extent of damage to the helicopter was not reported.

D: May 14
N: Japan Air Self-Defense Force/5th Kokudan/305th Hikotai
T: Kawasaki T-4
S: 96-5625

This aircraft, from Nyutabaru Air Base, had escorted an F-15 to Komaki Air Base for scheduled maintenance. It took off again from Komaki after picking up the F-15 pilot to return to Nyutabaru but was destroyed when it crashed at 1508hrs local time and sank in the northwest corner of the Iruka Reservoir, Inuyama City, Aichi Prefecture, just two minutes after take-off. The two pilots were killed.

D: May 15
N: French Securité Civile
T: Canadair 415
S: F-ZBFY '35'

This aircraft sustained substantial damage, including a hull leak, when it hit submerged rocks while scooping water at approximately 1000hrs local time during a training exercise in the Gulf of Porto Vecchio, Corsica, following which it made a safe emergency water landing and was brought back to Porto Vecchio. The two pilots and a fireman on board were not injured and evacuated safely. Divers were subsequently dispatched to examine damage to the hull and found a 10ft (3m)-long gash below the waterline. Société Nationale de Sauvetage en Mer (SNSM – National Maritime Safety Service) personnel and firefighters then sealed the aircraft to prevent it sinking. A second Canadair 415 also sustained less serious damage.

D: May 16
N: Bolivian Air Force
T: Cessna 210L Centurion
S: FAB-354

After landing heavily at Riberalta-Capitán Av Selin Zeitun Lopez Airport at 1600hrs local time, the aircraft's nose undercarriage collapsed and it ran down the runway for some distance on its nose before veering off the runway.

No injuries were reported but the Cessna sustained substantial damage to the propeller and nose section.

D: May 16
N: Ukrainian Air Force
T: F-16AM

While attempting to counter a Russian drone attack over Ukraine, contact with the aircraft was lost at 0330hrs local time. Preliminary data indicates that the pilot had destroyed three air targets and was working on a fourth using the aircraft's cannon. At this point an emergency situation arose, forcing the pilot to eject after pointing the F-16 towards an uninhabited area. The aircraft was destroyed but the pilot ejected and was quickly found by a combat search and rescue team and safely evacuated. Although unconfirmed, it is believed that the F-16 fired at a drone when it was too close to it and the debris from its explosion brought down the fighter.

D: May 16
N: Ukrainian Air Force
T: MiG-29 *Fulcrum*

During a combat mission over Zaporizhzhia Oblast, Ukraine, the aircraft was shot down and destroyed at approximately 1025hrs local time by a Russian S-400 Triumf long-range surface to air missile system. The fate of the pilot remains unconfirmed.

D: May 18
N: Egyptian Air Force
T: Unidentified fighter

During a routine training flight, the aircraft was destroyed when it crashed in the sea near Beach 63, Ras-El Bar, in northern Damietta Governorate. Both pilots were killed.

D: May 19
N: Mexican Air Force/ Escuadrón Aéreo 401
T: F-5E Tiger II
S: 4504

While landing at Base Aérea Militar 13, Chihuahua-Gen Fierro Villalobos Airport during a routine training flight, the starboard mainwheel tyre burst causing the starboard main undercarriage leg to collapse. The aircraft came to rest on the runway with its starboard wingtip and centreline fuel tank resting on the ground. The pilot was uninjured and the F-5E did not appear to have sustained any major damage.

D: May 20
N: Myanmar Air Force
T: Mi-17

This helicopter was destroyed when it was claimed to have been downed by anti-aircraft fire from Myanmar Kachin Independence Army resistance fighters and crashed in a forest between Bhoma and Shwegu, Kachin state. Two crew members were killed. A second helicopter was also reported hit but was able to make a safe emergency landing in Shwegu.

D: May 23
N: Russian Air Force
T: Mi-8

Following a technical malfunction during a routine flight, this helicopter was destroyed in a crash in a deserted area near the village of Naryshkino, Uritsky District, Oryol Oblast. Both crew members were killed.

Additional material from:
Asagiri Yohko and Scramble/Dutch Aviation Society.

Mexican Air Force F-5E Tiger II 4504 after the starboard main undercarriage leg collapsed on May 19 while landing at Base Aérea Militar 13, Chihuahua-Gen Fierro Villalobos Airport *via Twitter*

Next Issue

Dutch defence minister Ruben Brekelmans (centre) after his F-16 orientation flight from Fetesti, Romania, with Major General Stallmann (right) and an EFTC contracted flight instructor. *Mediacentrum Defensie, Sgt Jasper Verolme*

• Exercise Dragoon Fury

As a cornerstone of the French Navy's amphibious fleet, the PHA Tonnerre actively participated in Exercise Dragoon Fury on March 3-14. Her vast flight deck was transformed into an essential training ground for army helicopter qualifications. Francois Notre reports

• Europe's missile arsenal

Russia and Ukraine have been trading missiles and drones in a series of devasting attacks on cities, infrastructure and air bases. This sustained aerial campaign has put European air forces on the spot: do they have the right weapons for this type of warfare and are they investing enough in weapons stockpiles? Tim Ripley investigates.

Building the Ukrainian Viper Force

The Netherlands completed its delivery of 24 F-16AMs to the Ukrainian Air Force on May 27. The donation of the aircraft is part of a large multinational effort, which should lead to a fourth-generation Ukrainian air force. Gert Kromhout reports

NEXT ISSUE

The August edition of AirForces Monthly is on sale from 17 July 2025

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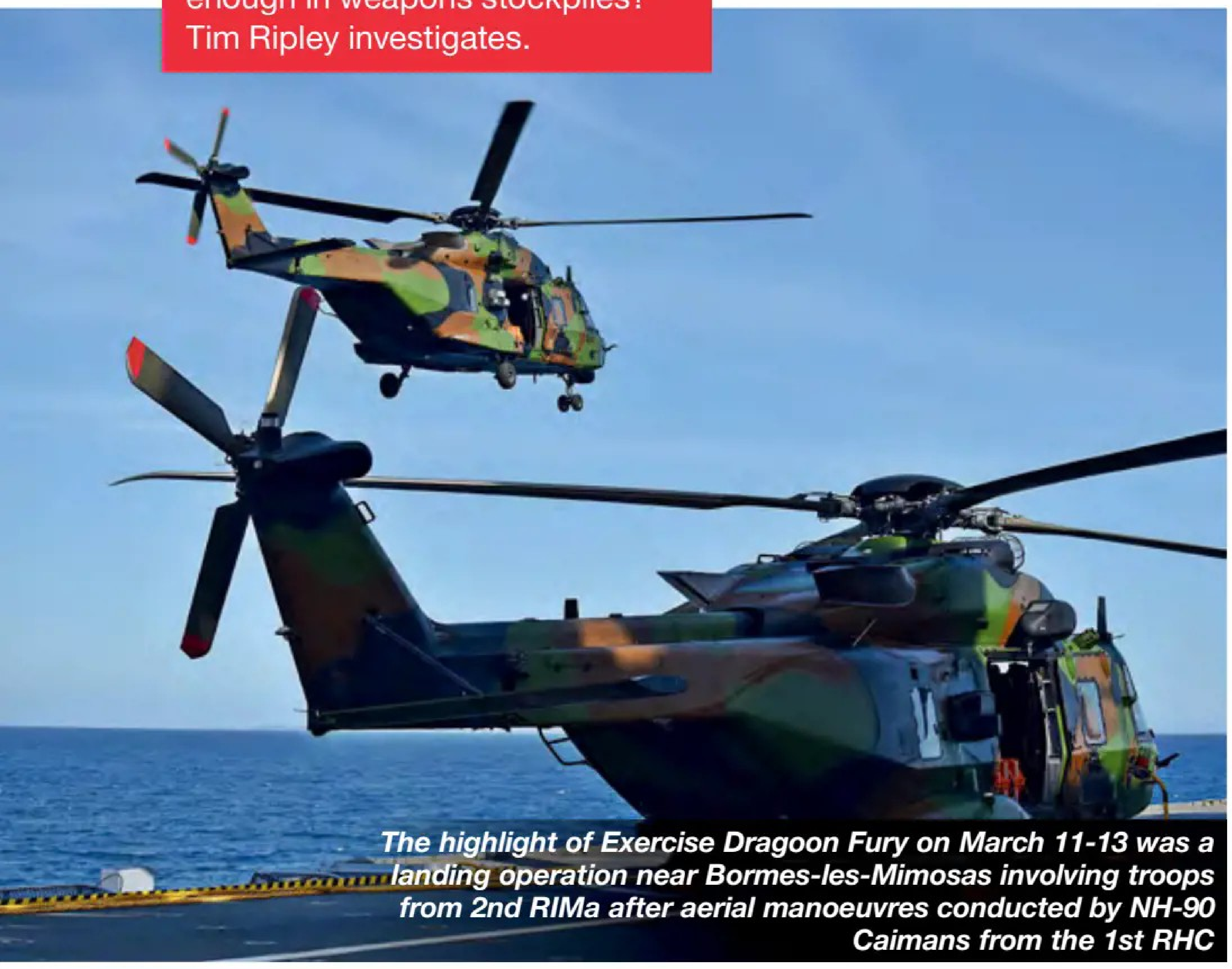

The highlight of Exercise Dragoon Fury on March 11-13 was a landing operation near Bormes-les-Mimosas involving troops from 2nd RIMa after aerial manoeuvres conducted by NH-90 Caimans from the 1st RHC

The SPEAR 3 is still undergoing test firings ahead of its entry into RAF service on the F-35B Lightning II. *MOD/Crown Copyright*

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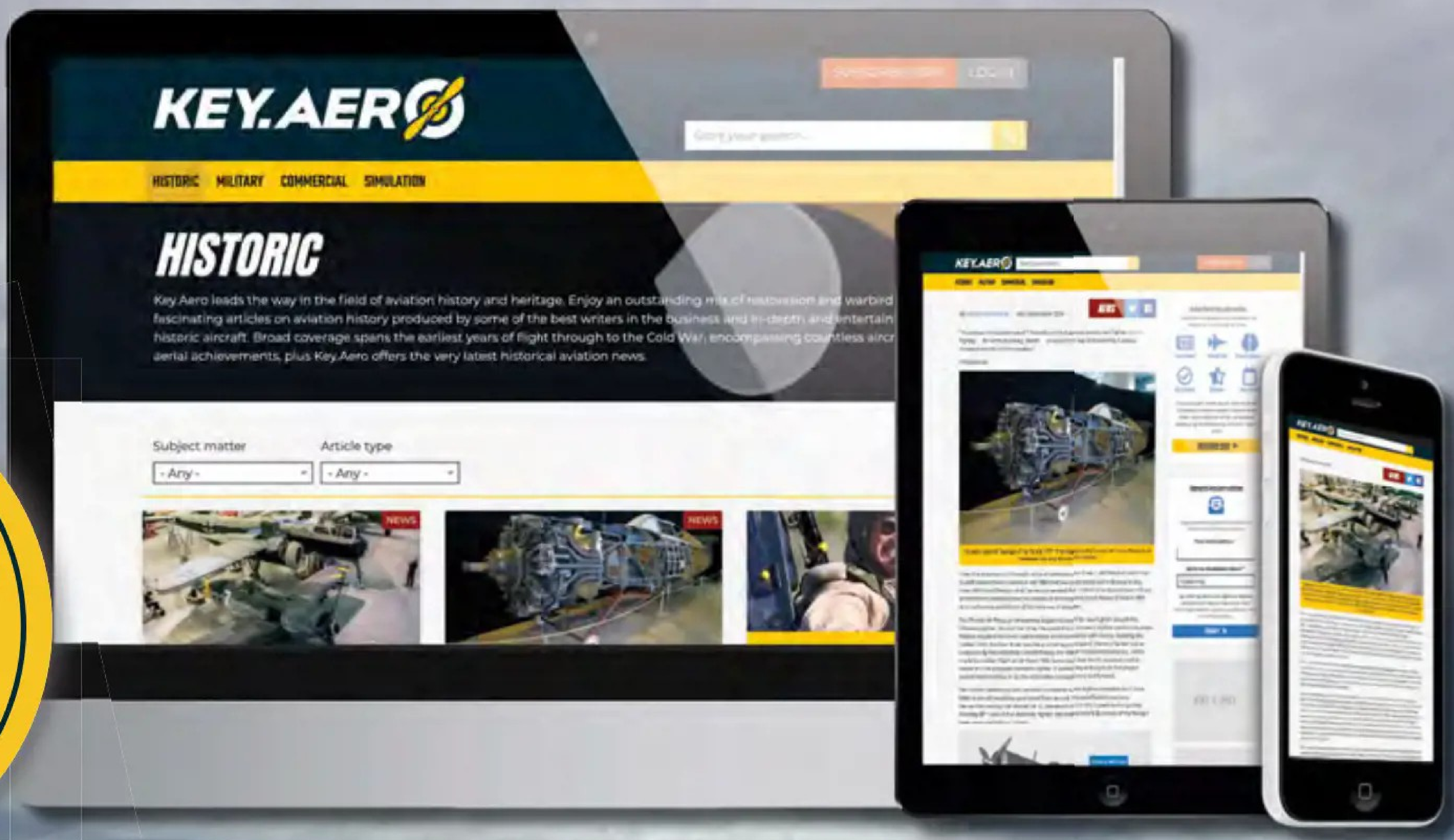
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